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Engineering News-Record

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In This Issue:

Bonneville Dam Fishways

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New Water Supply At Fort Smith. Ark.

*

Tennessee Valley Activities Today

*

Chrome-Copper Steel For a 1,080-ft. Arch

*

Paving Brick Association Report of Annual Meeting

One of the channels for guiding fish to their spawning grounds above the Bonneville Dam.

NEW METHOD uses OLD STANDBY for...

Bridge Protection!

● Bridge protection, an old problem, has had more attention recently than in previous years. And with it has come a wider use of wrought iron for blast plates, cover plates, deck plates, bridge railings, pier protection plates, drainage lines, and downspouts.

Leading railroad and public officials and engineers have accepted wrought iron, their old standby, on its well-known ability to withstand corrosion in bridge service caused especially by sulphur-laden smoke and brine drippings.

Expensive bridge structures should not be employed as "testing grounds" for new or unproved materials. Wrought iron has an unparalleled record of actual service in bridge construction ranging from structural members to blast plates. Many installations are still in service after 60 years.

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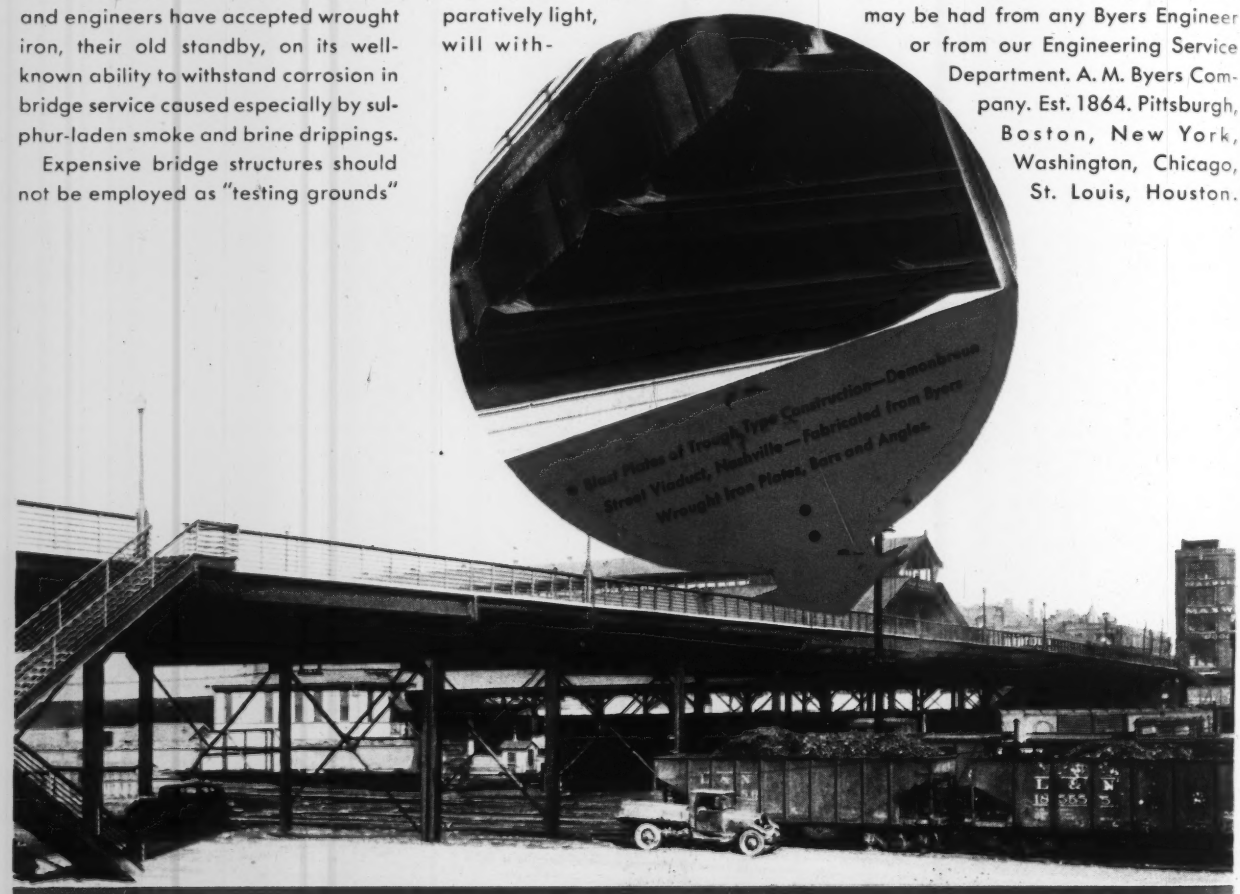
Complete information is contained in the report "The Use of Wrought Iron in Bridge Construction," which may be had from any Byers Engineer or from our Engineering Service Department. A. M. Byers Company. Est. 1864. Pittsburgh, Boston, New York, Washington, Chicago, St. Louis, Houston.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NOW He Keeps Up-to-Date

NOT long ago a construction engineer—call him Jones because that is not his name—was commenting on his reading of this journal. He spoke of the years through which he had subscribed and of his interest in its technical articles, news and editorial comment. "But," he added, "not the least of my concern is to go pretty carefully through the advertising pages."

Questioning brought out that Jones' habit was no mere "happenstance." It developed that years ago he was "badly stung," as he put it, because up until then he had confined most of his interest to the reading pages, leaving the rest of the paper to more or less casual perusal.

At that time he was working for a contractor on one section of a large undertaking and was put in charge of an important and more-or-less emergency operation. Its cost had not been figured in the bid so the contractor would have to pay for it. The progress of the main job would be considerably influenced by its handling. He planned his operation according to the usual methods, planted it with the regular equipment, organized his crew and got going.

From the start it was a costly proposition. The site was such that he could handle only one unit and to meet the requirements of speed he had to put on a second shift with a lot of overtime. Thus his non-revenue job soon became a sore spot and he was under constant pressure for results at lower cost.

AFTER several weeks of grief a contractor friend, doing another section of the main project, dropped in for a visit. He strolled over the job and as he came up to this particular operation he took one look and exclaimed, "For the luvva Mike, why don't you put a 'Brown Gadget' on that job?"

Jones never had heard of a "Brown Gadget."

"Come here," said the visitor, "and I'll show you."

Leading Jones to the office shack nearby, he picked up the current issue of *Engineering News-Record*, thumbed through the advertising pages for a moment, and pointed to an advertisement that showed the "Brown Gadget" in operation.

"There's a machine," he said, "that's made to order for your job and will turn out twice as much work with the same crew that you've got out there. It has been out for three or four months and I have one on my job and another ordered."

It was too late to tear down that job and start all over but Jones says that he never has forgotten the "Brown Gadget" or the grief that he suffered because he had failed to keep up to date on the tools of his trade. Ever since then, when he picks up his *Engineering News-Record* he has made that job a matter of first priority.

This conversation was vividly recalled as this writer inspected the exhibits at the Cleveland Road Show a few weeks ago. It was only three years since the last preceding Road Show, meanwhile we have been living through a depression; yet the developments in construction equipment challenged the interest of every visitor and elicited many orders for new units to replace obsolete items in the plant of contractors who attended the show.

A SHOW such as this, presenting the actual equipment in full size, offers a unique opportunity for examination and demonstration. But every construction man cannot get to see the show; neither can any of them spend enough time watching such equipment actually in operation to learn about all the conditions under which it may earn profits for them.

So vast an educational and selling job is the regular, periodical task of each manufacturer: to make its performance possible is one of the several functions of this and kindred journals. Thus the advertising pages of the successive issues constitute a continuous exhibit before the whole industry of the products available for better, speedier, safer and more profitable construction.

The wise construction man knows this; he follows Jones' example and takes no chances on being "badly stung" for want of the knowledge he can acquire from a few minutes with each successive issue of this unique display of the materials and equipment he needs in his business.

Willard Chevalier

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FIRST!

IN DEPENDABILITY AND PERFORMANCE

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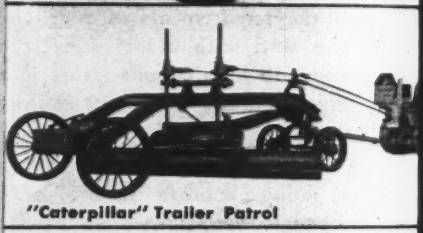
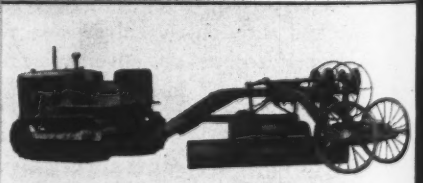
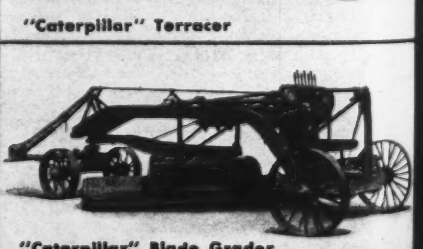


"Caterpillar" Trailer Patrol

"Caterpillar" Elevating Grader



"Caterpillar" Terracer



"Caterpillar" Blade Grader

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In The News:

THE 1935 POPULATION of the United States has been officially estimated by the Census Bureau at 127,521,000. The new figure represented a gain of 0.71 per cent from 1934 and of 4 per cent from 1930, when the last actual census was taken.

PRESS REPORTS of a recent flood in the Sacramento Valley in California, quoted in this column in our issue of Jan. 23, were greatly exaggerated, according to Edward Hyatt, state engineer. Breaks of 350-ft. total length did occur in the levee downstream from the Moulton weir, flooding 400 acres of land. In no other part of the whole flood-control district were levees broken or land flooded except in bypasses or flood channels.

THE SIXTH AVENUE MUNICIPAL SUBWAY for New York City—2¼ miles in length and estimated to cost a total of $52,000,000—advanced to the construction stage with the execution of a $6,000,000 contract last week for the first section.

UNIFIED air-express service was inaugurated early this month when 22 major air lines joined with the Railway Express Agency to coordinate high-speed cargo transportation facilities throughout the United States. Approximately 23,000 cities and towns will share in the benefits of expedited delivery service that will provide a 20-hour coast-to-coast shipping schedule.

CREWS on the Parker Dam diversion tunnels of the Southern California Metropolitan Water District Aqueduct project passed the halfway mark on their excavation schedule at the end of January. It is expected that the two 29-ft.-diameter bores, each 1,700 ft. long, will be lined and ready to carry water sometime in July.

In This Issue:

ONE OF THE MAJOR SOURCES of salmon in North America is the Columbia River, where the annual catch is valued at $10,000,000; preservation of this industry is claimed to depend upon the fish reaching their spawning grounds above the Bonneville Dam. In order that the fish may reach the upper regions of the river after the dam is completed, an elaborate system of fishways is being constructed, and their design is described in this issue.

SO MUCH PUBLICITY has been accorded to the electric power phases of the Tennessee Valley project that the real function of the work being done is generally misunderstood. Fundamentally, the activity of the Tennessee Valley experiment is concerned with the broad social and economic problems of regional development. The scope of the undertaking and its present status are summarized by S. T. Henry, *Engineering News-Record's* observer on the scene.

Next Week:

THREE YEARS AGO a bold attack on the historic problem of controlling the Mississippi River was begun along a radically new line. Tradition asserted that the river's winding course must not be changed and its countless bends must be retained, but the new philosophy of river control is predicated on straightening the alignment by making cutoffs across the bends. An authentic account describing the results of this striking experiment, the first to be given open publication, has been prepared by George R. Clemens, senior engineer of the Mississippi River Commission.

AT THE 30TH ANNUAL MEETING of the National Paving Brick Association, attention was centered on the research advances made in connection with joint fillers and the properties of brick made from de-aired clay. A staff report gives the details of the preceedings.

A 1,080-FT. ARCH HIGHWAY BRIDGE in South Africa—third longest of its type—introduces a new steel alloy in bridge construction. Containing chromium, manganese and copper, the new alloy product combines high-tensile strength with light weight; this latter feature was an important factor in the erection procedure because all material had to be transported 80 miles from the railroad line.

SALT WATER from oil wells, excessive silt from farm soil erosion and sewage pollution made it necessary for Fort Smith, Ark., to abandon a river water supply and seek a new source of supply. A mountain stream 23 miles from the city has been impounded behind a combined earth- and rockfill dam, and the water is conveyed after filtration through a smooth-coated pipe line to the distribution mains.

TO FIND OUT what happens in the way of expansion and shrinkage in a concrete structure during and after construction and under changing weather conditions, Carl L. Gerber, structural engineer in the office of the Constructing Quartermaster, Washington, D.C., describes the procedure adopted in obtaining a record of movement in the riding hall at Fort Meyer, Va.

THE ILLINOIS SOCIETY OF ENGINEERS celebrated its 50th anniversary with a special meeting devoted to a review of developments in engineering during the past half century. The historical facts enumerated in this special program form an interesting report.

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by avoiding long detour maintenance

AMERICAN SHEET AND TIN PLATE COMPANY PITTSBURGH TRADE MARK REG. U.S. PAT. OFF.

COMMISSIONERS, engineers, and contractors know from bitter experience the high cost of maintaining detours over long periods, to say nothing of the unfavorable public reaction.

American Sectional Arches and Culvert Pipe can help cut such costs, and a minimum allowance can be made for construction delays due to weather conditions, hauling and handling of materials, excavation and erection. Not only that, but they are adaptable for all types of sewers, for enclosing small streams, for conduits and for the replacement of unsafe or damaged structures.

Both first cost and maintenance costs are relatively low. The guaranteed coating resists weather conditions, frost and ice. Then, if for any reason, you must move a structure from one location to another, American Arches and Culvert Pipe will be found to have high salvage value.

You'll find our bulletin on this subject very interesting—send for it.

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UNITED STATES STEEL

ENGINEERING NEWS-RECORD

February 13, 1936

FIG. 1—MODEL OF BONNEVILLE DAM in the outdoor hydraulic laboratory at Portland, Ore., showing at the left a fish ladder and one of the fish locks by which salmon may pass the dam on their way to their spawning ground.

Fishways at Bonneville Dam to Cost $3,550,000

Columbia River salmon catch valued at $10,000,000 annually—Six passages by which fish may pass dam en route to spawning grounds—Three pairs of locks, each with daily capacity of 25,000 to 30,000 fish—Water discharge in fishways 5,650 sec.-ft.

THE TYPE of fishways that should be included in the Bonneville project to assure salmon of unhindered access to their spawning grounds above the dam has been a controversial topic since plans for this project were first proposed. The Columbia River spawning grounds are considered one of the major sources of salmon supply in the North American continent, and the value of the annual salmon catch on the Columbia is estimated at $10,000,000. Most of the fish spawn above Bonneville, which is at the head of tidewater. In the original designs for the dam the intention was to include only four conventional fish ladders of moderate size, estimated to cost a total of $800,000. Since then much attention has been focused on this subject, and repeated meetings and hearings have been held. The outcome, which represents cooperative endeavor of the U. S. Bureau of Fisheries, the fish commissions of the states of Oregon, Washington and Idaho and the U. S. Engineer Corps, is an elaborate system of traps, locks, ladders and canals which will add to the cost of the project a total of $3,550,000. What the fishway designs include and how the several methods of getting the fish past the dam are to operate are outlined in the following.

The major salmon runs occur between March and October, which includes the period of high water; a relatively small number of fish migrate upstream during the remaining portions of the year. During the high-water period at Bonneville variation in tailwater level may be as much as 40 ft., while the forebay surface may vary about 12½ ft. Thus it was necessary to provide for lifting fish a varying height. The range in lift is from 35 to 60 ft. Only rough estimates could be obtained of the number of fish that might be expected in a run; it was thought that large runs might congregate in either channel or on either side of the main channel. With this in mind the locks were designed on the basis of a capacity of 25,000 to 30,000 fish per 24 hours at each of the three locations.

The locks are all in pairs to provide for continuous operation. That is, fish always can enter one or the other of the pairs at each location. In addition to and independent of these three locks there are three other routes, all involving the ladder principle, by which fish may get upstream past the dam. These include: (1) a ladder on the Washington shore, (2) a ladder on the island accessible both from the main channel at the spillway dam and from the south channel at the power house, and (3) a long canal and ladder entirely on the Oregon side of the river, which has its entrance at the mouth of Tanner Creek. This latter route leads the fish south of the navigation lock to the forebay.

Fish locks and ladders

All three lock pairs will have the same dimensions, quantity of water supply and mechanical features. Each lock

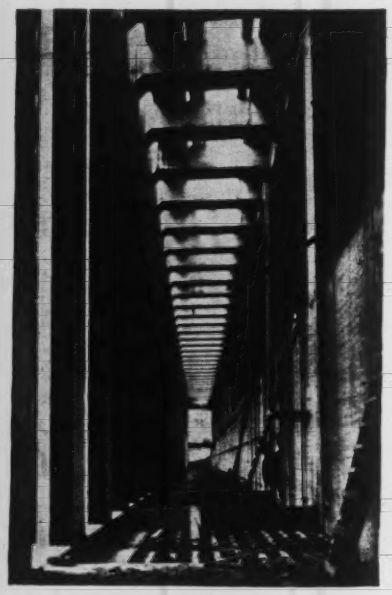

FIG. 2—THE COLLECTING CHANNEL above submerged draft-tube discharge openings on downstream side of power house.

is 20 ft. wide and 30 ft. long; the height of the lift at any time is determined by the difference in level between tailwater and forebay. Fish are to be attracted into the lock chambers by a flow of water through an opening whose vertical location is adjustable to suit tailwater variations.

In operation the locks are similar to a navigation lock in that when sufficient fish have entered, the entrance gate is closed and the lock is filled with water to forebay level. An upper gate then is opened, and the fish are free to escape into the forebay. To facilitate the exit of the fish, a slotted floor is installed in each lock, and this will be raised by mechanical means as the lock fills, thus keeping the fish confined in a relatively small water volume. When the exit gate is opened, the floor can be raised high enough to force the fish to move on into the forebay.

The ladders are of reinforced concrete, using typical pool construction with a gradient of 1 in 16. The pools are 16 ft. long with a width of 40 ft. above weir elevation +20 and 30 ft. wide below that level. The Tanner Creek passageway will have a gradient of 1.5 in 16 for the ladder portion; the canal between the ladders will be 40 to 50 ft. wide with a 5-ft. water depth.

To provide a water supply to attract fish over the wide range of tailwater elevations, the flooded sections of all ladders are to be supplied with additional water from conduits that discharge into the fishways through diffusion chambers. This additional water is to maintain the desirable velocity of flow within the ladders. The diffusers, by keeping the entrance velocity low, avoid interfering with the attractive velocity in the channel through which it is desired to have the fish pass. This feature also permits the use of fixed entrances to the ladders regardless of river stage.

Collection facilities

Collection facilities will be provided across the downstream face of the power house and at each end of the spillway dam. At the power house the fish will be collected in a large channel or trough extending across the downstream side of the building immediately above the submerged discharges from the draft tubes. This route is to be made attractive to the fish by water fall-

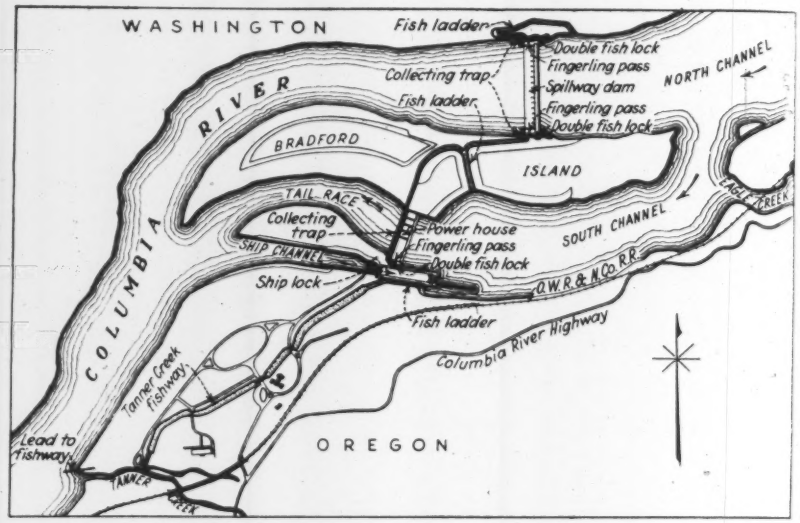

FIG. 3—SEVERAL ROUTES are provided by which fish may pass Bonneville Dam.

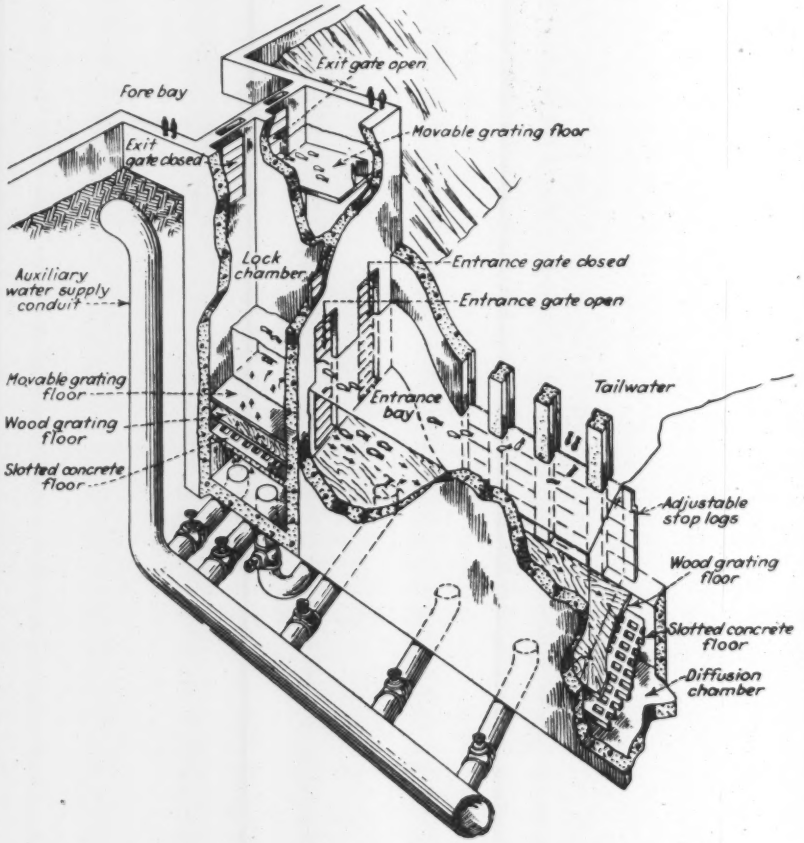

FIG. 4—FISH LOCKS AND COLLECTION SYSTEM at the power house. The locks are in pairs, so that fish may enter one while discharge from the other is taking place.

ing over weirs or discharging through submerged openings. A flow of about 1,800 sec.-ft. is to be provided to discharge from this trough. This quantity is larger than can be brought through the fishway trough to the weirs without excessive velocity. Hence additional water is supplied to accomplish this purpose.

The additional supply is introduced from the passageway back of the trough at a velocity low enough not to form a counter-attraction that would interfere with the desired movement of the fish. An entrance velocity to avoid counter-attraction has been set at 0.5 ft. per sec. To keep the velocity down to this rate, slotted floors and baffles are used. Although conditions vary, about 1.5 ft. per sec. is commonly rated as attractive to salmon moving upstream through artificial fishways toward spawning grounds.

Traps and barriers

At the spillway dam a different type of collecting device is planned. It consists of a modification of the trap used by commercial fishermen. At each end of the dam a concrete training wall extends downstream on either side of the end spillway gate. Between the lower ends of these walls is placed a removable trap wall consisting of a series of V's with a spread of 10 ft. at the downstream end, narrowing to a 12-in. opening at the upstream end. About 20 ft. upstream from the V a removable barrier prevents the fish from going farther up the spillway. Trap and barrier walls are built of structural steel and wood, with vertical slots 1 in. wide to permit the passage of water. Water is admitted through the spillway gate; ordinarily it is proposed to discharge 1,600 to 2,000 sec.-ft. of water at each end of the dam to attract the fish into this collecting device. After passing through the V's the fish have access either to lifts or ladders; both these routes are made attractive by flows of suitable velocity.

As an additional aid to the upstream migration of fish, a connection was provided between the navigation lock and the power-house collecting channel. This involved only a small added cost for the gate necessary at this connection. It forms a supplemental fishway that may be particularly useful when the others are out of service.

Water for migration downstream

Steelheads on their way downstream after spawning as well as ocean-bound fingerlings can pass either through the spillway of the main dam or through the turbines without serious loss, it is believed. The turbines are of the propeller type 23 ft. in diameter and have an operating speed of only 75 r.p.m. However, at the location of the fish locks it was thought desirable to provide passage for downstream migrants that might find their way into these areas. Accordingly, "fingerling passes" will be built at these points, consisting of small ladders on a very steep gradient.

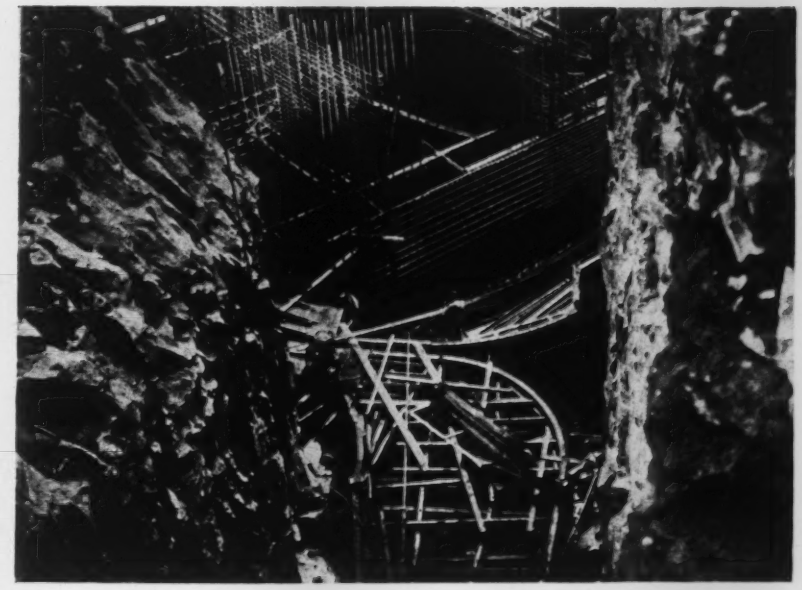

FIG. 5—ROCK CUT and heavy reinforcing steel in the fish lock between power house and navigation lock.

The estimated quantity of water desirable for operating the fishways is given in the accompanying table. The amounts shown for each item are those to be provided during the season of liberal streamflow. Fortunately for the power development, this season is coincident with the most important fish runs.

	Sec.-Ft.
Washington shore ladder	800
Washington shore locks	800
Bradford Island locks	800
Bradford Island ladder	
Dam branch	800
Power-house branch	800
Power-house locks and collecting system	1,200
Tanner Creek passageway	450
Total	5,650

Periods of minimum flow occur during the cold winter months when few fish are running upstream. At such times it is estimated that fishway water use may be kept down to as little as 1,500 sec.-ft. if the remainder of the flow is needed for power generation. The approximate total cost of fishway facilities as now laid out is estimated as follows:

Washington shore ladder	$590,000
Washington shore locks and collecting facilities	560,000
Bradford Island locks and collecting facilities	630,000
Bradford Island ladder	810,000
Powerhouse locks and collecting facilities	720,000
Tanner Creek passageway	240,000
Total	$3,550,000

Engineering direction

The Bonneville project is being constructed under the direction of the Corps of Engineers, U. S. Army, Major-Gen. E. M. Markham, Chief of Engineers. The staff at Portland is headed by Col. T. M. Robins, division engineer, Major C. F. Williams, district engineer and C. I. Grimm, chief civilian engineer. Preparation of working designs and construction drawings for fishways is in charge of Ben. L. Peterson, engineer, of the army engineers organization. Harlan B. Holmes, of the U. S. Bureau of Fisheries, is stationed at Portland in the interest of Bonneville fishways.

Automatic Pumping System Eliminates Labor Cost

A fully automatic diesel water-pumping plant at North Easton, Mass., is, after two months of service, maintaining the required pressure differential and is also supplying heat for the pumping station, maintaining a temperature of 70 deg. F. The plant consists of a 100-hp. six-cylinder, four-cycle diesel engine connected to a single-stage centrifugal pump, mounted on a cast-iron base. The pump, at a speed of 1,400 r.p.m., is delivering from 800 to 1,000 gal. per minute against a total operating head of 170 ft. Other diesel plants for pumping water have required labor items to be charged against operations. The North Easton plant, being fully automatic, eliminates this item, and cost of operation may be compared directly with electric power by the cost of fuel and lubricating oil. This plant is now pumping at a cost equivalent to an electric power rate of less than four mills per kw.-hr. This is less than the cost of formerly purchased electric power at 2.8c. per kw.-hr. The only attention that is required by the pumping system is an occasional checking of the lubrication.

Tennessee Valley Activities Today

Regional development work ranging from flood control and navigation improvement to agricultural and forest development is TVA's fundamental problem, largely overlooked because of power controversies

S. T. Henry
Southeastern Representative of Engineering News-Record, Spruce Pine, N. C.

BECAUSE of the emphasis laid on the power phase of the Tennessee Valley development project by utility controversies, the fundamental character of the project is but little known. For this reason *Engineering News-Record* asked Mr. Henry, who lives in the Tennessee Valley area and has followed its work closely since its first beginnings, to prepare a brief survey and summary of the development of the project. His article, an authoritative and clarifying statement, gives a picture of the interrelation of the vital development phases of the project. His emphasis on the purpose of the authority to bring about a higher regional development on a voluntary basis and according to recognized governmental procedure invites special notice. —EDITOR.

OBSCURED by bitter arguments for and against the entrance of the Tennessee Valley Authority into electric power service, most of the TVA's fundamental regional activities—in permanent agriculture, in land utilization, in reforestation, in improved social conditions and a dozen others as important which the authority was directed by Congress to undertake—have received little public attention outside the valley. To understand the Tennessee valley situation, one must first appreciate these activities.

For example, canalization of the Tennessee River to provide better navigation, which is rapidly being extended by the authority, looms large to proponents of water transportation. Again, flood control on one of the principal streams of the country is an inherent part of the project as a whole. Yet in spite of such facts many people believe that electrical generation and distribution is all that is being done.

In consequence, the underlying philosophy of the vast regional experiment which the authority undertook has been shoved into the background. That basic thought was to determine whether the wasteful timbering, farming and industrial practices followed for more than a century can be changed, and whether two million people can be influenced by leadership and demonstration to proceed along more constructive and permanent lines, entirely within the framework of the American form of government, and on a wholly voluntary basis. Navigation, flood control and power service are merely essential items in such an experiment. They do not outrank several other vital projects.

One of the latter is elimination of plowed crops on lands too steep for cultivation, and their replacement with grasses and legumes on a practical commercial basis. Another is reforestation, which potentially affects millions of cut-over acres suited only for timber. Location of towns, cities, roads, railroads, industries and other physical improvements with an eye to the future cannot be overlooked. Assistance in research necessary to prove the commercial possibilities of dormant local resources opens large opportunity for creating the increased income that the area so greatly needs.

It needs no argument to show that no one of these features of the great regional experiment can successfully be carried to its ultimate conclusion without one or more of the others; they are intimately connected, and all have a bearing in determining the extent to which regional planning and execution is practicable under existing conditions. Success in any one effort will add to the useful wealth of the country. If, therefore, they are properly coordinated in their development, the experiment as a whole is held to be capable of defraying the cost of such a vast conservation project. If it succeeds in a region so badly handicapped as much of the Tennessee valley has been, then the possibilities are great elsewhere.

What has the Authority done?

Navigation—Norris Dam, located on one of the principal tributaries of the Tennessee and providing more than 3,000,000 acre-ft. of storage, has been practically completed. This dam will permit complete development of the water resources of that tributary. It also increases the low flow of the main stream to an important extent, improving navigation and making possible larger power development. No other headwater storage dam has been placed under construction. Some money was appropriated for a small storage project on the Hiwassee River in North Carolina, but work has not been started on this undertaking, due both to lack of sufficient funds and to difficulties over flowage rights.

Four great dams on the main river are in various stages of construction, varying from a bare start to well along toward completion. In their order, going upstream, these are: Pickwick Landing Dam, which ultimately will be the second above the confluence of the Tennessee with the Ohio; Wheeler Dam, located 17 miles upstream from the much-publicized Muscle Shoals development, Wilson Dam; Guntersville Dam, at the head of slackwater of the Wheeler project; and Chickamauga Dam, the farthest upstream for which funds have yet been appropriated. Wheeler Dam is scheduled to be completed in 1936, while Pickwick is about 30 per cent completed. Guntersville is just well begun, and Chickamauga is still in the preliminary clearing stages.

These four projects together with the private dam at Hales Bar will provide 9-ft. slackwater for all of the lower river except in the reach from Pickwick to the Ohio. Where and when a dam will be built to increase the present low-water stage of about 6 ft. in this lower reach is undecided. Possibilities are that a high dam on the Ohio lower down may eliminate the originally-projected lowest Tennessee River Dam. Above the Chickamauga pool two other dams will be needed to provide navigation to the head of the Tennessee proper. No early provision for them is in sight.

Flood Control—All of the great main-river dams for which funds have been appropriated provide collectively a large amount of flood storage on the basis of surcharging. To what extent they will prevent flood damage along the stream under various known or possible high-water combinations remains to be proved, however. As for the effect on the Mississippi, the complete regulation of the Tennessee would affect the maximum stages of the Mississippi only fractionally.

Inseparable from the flood-control and navigation improvement of the river obtained by Wilson Dam and the four dams now under construction is the water power which they render available. The amount of firm power capable of development depends on the extent to which regulation of floodflows is accomplished. Norris Dam importantly increases the dry-weather flows of the main stream, whose low minima made a single independent power project on the latter unattractive financially. The surcharge storage of all four dams also will assist in increasing the firm power. But the effective full development of the stream's power will call for far more headwater storage than any projects thus far considered would make possible.

To summarize in a paragraph or two a situation about which many reams

have been written appears difficult. But the facts are comparatively simple.

Power a minor element

TVA at present is generating energy only in the power house at Wilson Dam, which was in existence when the authority was created. Contracts have been let for the wheels and generators for two 55,000-kw. units in a power house at Norris Dam, to be ready to run some time in 1936. Contracts for two wheels in a power house at Wheeler Dam have been let, and these units can be in service some time after the Norris installation comes into use. At present no generating units are contemplated at Pickwick, Guntersville or Chickamauga.

Thus, within the next year or two the TVA will command a generating capacity that is small compared with the total that could be developed at the six dams of the present program. Moreover, the amount of firm power available from this capacity is relatively minor. In other words, the TVA power program is largely in the future.

When it comes to the distribution of electrical energy, TVA has been so completely blocked by various court actions that it is supplying only a few small towns and rural communities. Several large cities, notably Memphis, Chattanooga and Knoxville, have voted to provide themselves with municipal distribution systems using TVA power, but thus far TVA has been held off by the court actions.

Resale rates and resale contracts of TVA power have aroused more comment that all other features of the entire valley project. But as a matter of simple fact the scale on which the TVA is rendering electrical service is so small that no conclusive financial judgment is yet possible. Beyond a question the TVA rates have stimulated domestic consumption faster than in any other areas of comparable size. At the same time, adjacent large areas served by private utilities, which have also greatly reduced their domestic rates, lead the country in increase of energy use.

Some indeed claim that the entire cost of the TVA project to date is justified by the reduction in the cost of domestic electricity in the entire country resulting from cuts in rates which they attribute to TVA's entrance into power service. Against this, utility operators have many counterclaims. For the moment it seems well to wait a bit to see what history will record.

Construction rapid and cheap

Meantime, attention must be called to the remarkable speed with which TVA has undertaken and prosecuted one after another of the great dam projects assigned to it to execute, totaling something like $150,000,000 in cost. Norris is practically done a year ahead of TVA's estimate, having been built nearly two years faster than was originally allowed before TVA entered the picture. When funds were appropriated to build Wheeler, the dam was under way in a matter of days, and progress since then has been so consistently rapid that the structure will be done well ahead of a very short construction time limit. Pickwick similarly was begun and carried forward with exceptional speed, and equally good coordination and execution are to be expected at Guntersville and Chickamauga.

All these projects have been handled by force account, the labor crews working directly under the engineers and superintendents of the authority. At Norris, at Wheeler, at Pickwick and at Guntersville work was begun before the final plans were approved, and the authority holds that each of these jobs would have been delayed very considerably had it been necessary to await completion of the plans and specifications in order to let contracts. Whether because of saving this delay or not, construction speed has been notable. Moreover, unit costs of construction are reported to be low; detail figures are to be available on all of the projects later.

Bringing about better farming

Close observers of the TVA project as a whole are convinced that no single feature of the vast experiment offers such promise of ultimate success and fundamental benefits as does the leadership shown in inducing great numbers of farmers in the valley to adopt methods which make for the permanency of agriculture under the local conditions. Handicapped by local prejudice, ignorance and inertia, the TVA has aroused thousands of farmers in the valley to the fact they can make money if they will farm on a basis of soil conservation. With more than a hundred years of soil devastation behind them, the valley farmers were steeped in traditional method, and though many attempts had been made to introduce methods that would stop erosion and tend to soil improvement these efforts had always failed. Now, at last, TVA has begun to reverse the trend. But a generation of educational and demonstration work will be required before the long-established wrong farming methods can be transformed.

Charged by Congress to make cheap fertilizer in the huge abandoned government nitrate plant at Muscle Shoals, TVA has confined its work there to the production of an improved phosphoric product so badly needed in the valley. No fertilizer has been sold, and TVA apparently has no idea of making fertilizer to sell.

The entire TVA fertilizer program has been tied in with practical farm demonstration, on a hitherto unknown scale, of the value of phosphoric fertilizer to cover crops. TVA has placed an expert in every county in the valley having a farm demonstration agent, and under the direction of these farm agents and experts the local people themselves have picked a few farmers in each county to use TVA fertilizer on cover crops in a long-time program, under close guidance and control. TVA has furnished fertilizer free to these farmers, the farmer paying the freight.

Only a start has yet been made in this improved farming program; years will be needed to show full results. But thousands of farmers already have seen that cover-crop farming will make money. Given a decade or two, the agriculture of the valley will be changed completely as the outcome of this demonstration program. Such a change will mean that soil erosion will be largely stopped, stream silting reduced, and agriculture placed on a permanent basis.

Reforestation—TVA has done nothing new or startling in reforestation. With large numbers of CCC boys available, it has reforested extensive areas in the Norris Basin, and has done some limited work elsewhere. The main forestry accomplishment seems to be that TVA now knows closely what the problem in the valley appears to be. The areas suited only to timber production have been well determined. Much of the valley, it is known, is destined ultimately only for forests. Methods of reforesting these millions of acres have been determined. But to replant these vast reaches privately or publicly will be the work of generations.

Industrial research

TVA has done a limited amount of the practical industrial research which the act creating it contemplated as being needed to encourage private development of some of the promising resources of the valley. Some of this research work, notably on ceramic raw materials and electric firing of ceramics, promises early practical results that will be of national value. Most of the rest of the industrial research has been on strictly agricultural undertakings.

Land utilization

In the matter of land utilization and town planning, accomplishments stand about where the reforestation program does. Excellent studies to determine some of the problems have been made. An effective demonstration of town planning was carried out in the village of Norris, adjoining that dam. But so many conflicting interests and complicated physical and industrial problems have been encountered that actual progress is very limited.

Whether the remaking of a great area on a proper utilization basis is practicable has not been proved. The possibilities of avoiding in the future many of the mistakes of the past have been shown conclusively. But it is evident that to eliminate such mistakes in the future means so complete and voluntary a coordination of conflicting county, city and state interests and political powers that the early success of any such effort is highly questionable.

A New Source of Water Supply for Fort Smith, Ark.

Mountain stream impounded behind combined earth- and rockfill dam, and water conveyed after filtration by smooth-coated pipe line 23 miles to city

AN ENTIRELY NEW impounded gravity water supply is under construction for Fort Smith, Ark. In general it consists of an earth- and rockfill dam on Clear Creek, with new roads and concrete bridges, an 8-m.g.d. rapid sand filter plant a mile below the dam, a 23-mile 27-in. welded steel pipe line and 3 miles of 24-, 20- and 16-in. cement-lined cast-iron mains and connections to the existing distribution system. Construction has been under way since June 17, 1935, and will be completed this spring. Factors of interest are as follows: The new supply was made necessary because of pollution from upstream cities, salt from oil-well developments and excessive silt from the farm soil erosion. Half of the dam only is built of impervious material, because of its scarcity. Inlets to the gate tower are upturned elbows with novel conical screens. Enamel lining of the welded pipe line is used to boost carrying capacity, and the outside is wrapped with felt papers, as are gas and oil lines, to permit temperature movements without damage to the coating.

For 40 years Fort Smith has been using the Poteau River as a source of water supply. This river rises in the hills south of the city, and originally it was a clear unpolluted mountain stream. Gradually, however, the agricultural and coal-mining activities of this region have changed this river to a sluggish, dirty silt-laden stream. At flood times the Arkansas River backs up into the Poteau, pouring its polluted salt content into the latter until the water is unfit for use as a domestic supply. Like many rivers and streams of the southwestern areas it is increasing in silt content as the land is gradually being stripped of natural growth to make way for corn and cotton fields. Extensions and improvements to the existing Poteau supply were made in 1912 and again in 1923, both by the late Wynkoop Kiersted. An early description of settling basins appeared in *Engineering News*, 1898, part II, p. 107, and 1899, part I, p. 187.

Fort Smith is a city of 35,000 population, the center of a prosperous agricultural and mining district and the home of many small thriving industries. In looking for a new source of purer, softer and unpolluted water, thought was naturally directed toward the Ozark Mountains to the north, where sparkling clear streams flow the whole year through. Reconnaissance surveys finally indicated that the stream to be impounded should be Clear Creek, 25 miles north of Fort Smith, rising near Mt. Winslow in the Boston Range of the Ozarks. This creek is fed by springs, and it drains an area of 65 square miles, steeply mountainous, heavily timbered and sparsely settled. There is an all-year-round flow in the stream, even in the driest seasons. This new project is designed to take care of double the present population of the city, which it is estimated will be reached in 30 years; the supply works will take care of a much larger population.

The location of the Clear Creek Dam is like many in Arkansas and Oklahoma in that the site lends itself to the most economical type of dam construction because of the near-by availability of suitable materials, mostly a mixture of clay, sand and some gravel. In the case of

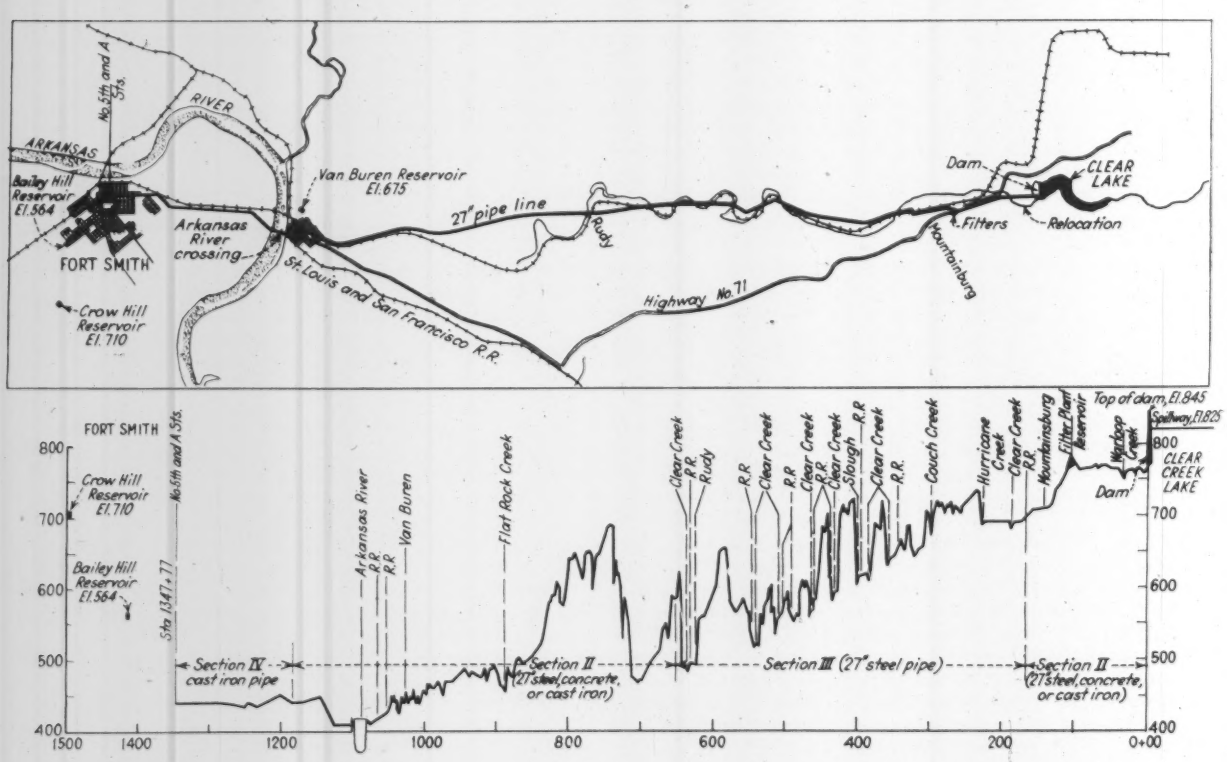

FIG. 1—ROUTE of the 23-mile, 27-in., welded steel pipe line northeast of the city closely follows a railroad location and Clear Creek, making many crossings essential.

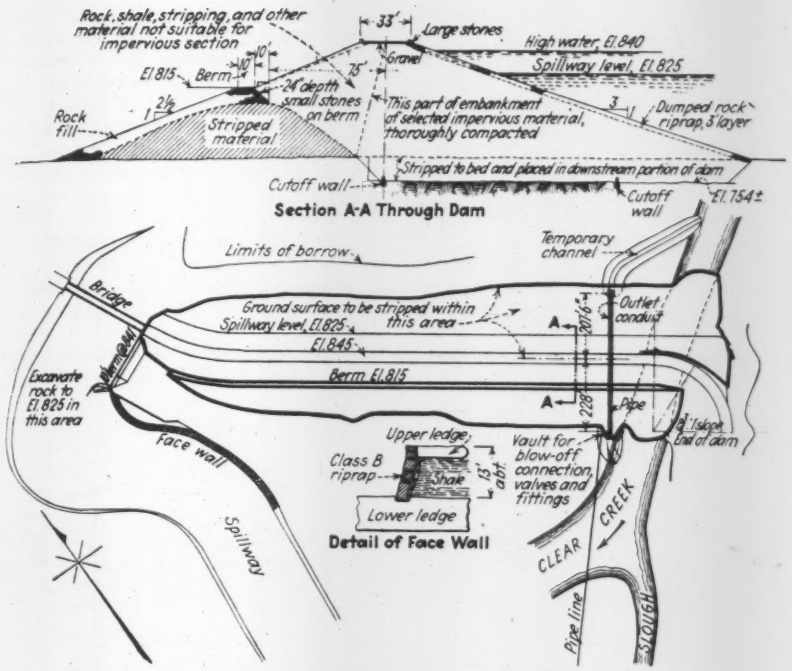

FIG. 2—CLEAR CREEK earth- and rockfill dam, with spillway cut through two massive sandstone ledges. The cross-section of the dam indicates how the pervious and impervious materials were placed.

the Clear Creek Dam, which requires 1,000,000 cu.yd. of fill, only one-half of the required amount of impervious material is available. Therefore the dam was so designed that the downstream half is constructed of semi-pervious material, such as gravel, rock and shale. The upstream side is built of impervious sand and clay, heavily riprapped. All of the materials used in the fill come from the excavations for the spillway and from borrowpits in the lake area just above the dam.

When completed, the dam will be 2,000 ft. long and 80 ft. high, and will impound a lake 2 miles long with an area of 650 acres. It will store 6,000 m.g. of water, and the top 15 ft. of the reservoir storage will be sufficient for a year's demand. The lake surface will be at El. 825. The top of the dam will be 20 ft. above the spillway level, and across it, between railings of native sandstone, will pass a highway. This is a piece of new construction that leads from U. S. Highway 71 a mile below, past the filter plant, over Warloop Creek on a new concrete bridge over the dam. After crossing the spillway on a concrete bridge 250 ft. long, it goes up the mountainside again to join Highway 71 at the hilltop.

Base of the dam

The foundation of the dam is a heavy bed of black shale. All of the area in the old stream bed to be occupied by the dam was stripped to the shale layer. The 17-ft. overburden of semi-pervious material contained no organic matter, and since it was composed mostly of river sand and gravel, it was used in the downstream toe of the dam. Trenches were excavated in the shale to a depth of 3 ft., and cutoff walls varying from 1 to 2 ft. thick were poured. 4 ft. above the shale. They were tied into the rock at either end of the excavation, and in this way the water will be prevented from following the smooth surface of the shale under the dam. Higher up along the overlying rock at either end of the high section of the dam, deep keyways are cut into the sandstone and shale ledges to provide a bond between the fill and the ledges.

The material for the fill is dumped in windrows either from trucks carrying from 5½ to 8 cu.yd. each or from track wagons of 15-cu.yd. capacity drawn by tractors. These trucks and track wagons are loaded in the borrowpits either by elevating graders or by steam shovels.

All the equipment is hydraulic-dump, and all but the trucks and steam shovels is diesel-powered. The material is leveled by bulldozers into layers, 8 or 10 in. thick, and when necessary it is sprinkled from a pipe-line watering system and rolled with sheepsfoot rollers. The crews work in five-hour shifts, starting at 6 a.m. and working until after dark under carbide lights located at convenient points.

The riprap on the dam is of hard sandstone excavated from the spillway section and is dumped 3 ft. thick on the upstream side, a 3-to-1 slope. The downstream slope is 2½ to 1. The guard-railing along both sides of the top will be composed of large blocks of this hard sandstone.

A picturesque spillway is provided by an unusual condition at the dam site, where the dip of the sandstone ledges at the west end of the dam allows the water to pass over them on a long curve 250 ft. wide, meeting the stream again 1,500 ft. below the dam. From the concrete wing wall at the end of the earth- and rockfill a curved concrete weir 420 ft. long follows the strike of the ledges across the spillway section where the 825-ft. contour intersects. The east abutments of the highway bridge and the wing walls of the dam rest upon an upper ledge of sandstone 3 ft. thick. Some 12 ft. below that ledge is a lower one, also of hard sandstone, 13 ft. in thickness, and this is the ledge over which the water will flow. On the inside curve of the spillway below the wing wall the intervening shale between the two ledges will be protected by a

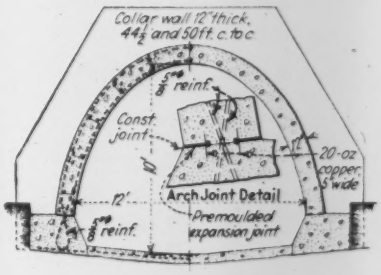

FIG. 3—STREAM CONTROL and outlet culvert under dam, showing arch barrel hinged at continuous footings.

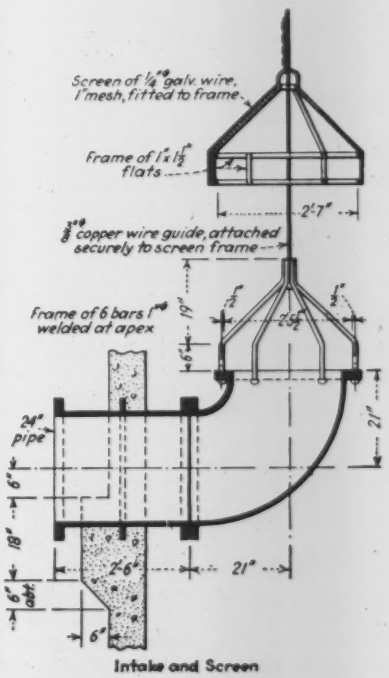
Screen of ¼" galv. wire, 1" mesh, fitted to frame
Frame of 1" x 1½" flats
2'-7"
⅜" copper wire guide, attached securely to screen frame
Frame of 6 bars 1" welded at apex
24" pipe
21"
2'-6"
21"
Intake and Screen

FIG. 4—INLET DETAIL, showing how conical screens are attached.

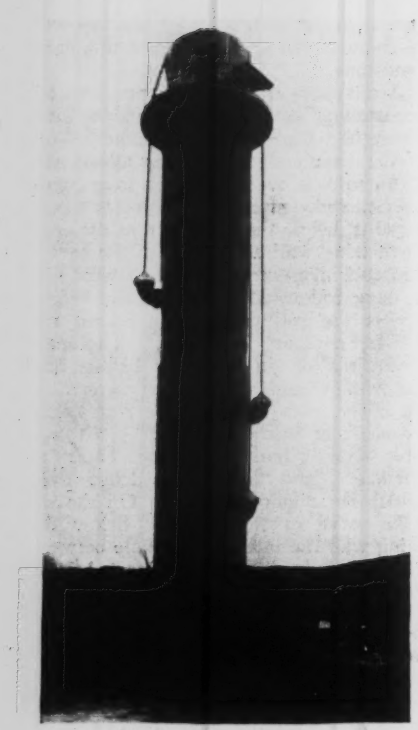

FIG. 5—INTAKE TOWER with inlets formed by upturned cast-iron elbows covered with conical screens.

masonry wall of heavy stone blocks concreted together.

With an overflow 15 ft. in depth, which leaves a 5-ft. freeboard on the dam, the weir has a capacity of 65,000 sec.-ft., or 1,000 sec.-ft. per square mile of drainage area, twice the estimated maximum runoff.

Diversion conduit

A reinforced-concrete conduit, 452 ft. long, extending from the intake tower to the downstream toe of the dam, provides for the control and bypass of the stream during construction and also serves as a gallery for the 30-in. welded steel outlet pipe that is suspended by hangers from the top of the culvert. As shown in Fig. 3, the culvert consists of an arch barrel 12 in. thick, springing from continuous footings on the bedrock and a concrete invert 6 in. thick. The conduit has a maximum width of 12 ft., a maximum height of 10 ft. and a capacity of 4,000 sec.-ft. during construction, which will take care of ordinary freshets. The streamflow is admitted to the conduit through a temporary opening in the upstream side of the intake tower, which will be closed with two reinforced-concrete plugs set in the grooves already provided.

The arch barrel is hinged at the top of the footings, thereby definitely fixing the location of the line of thrust at the abutments. The hinge construction is shown in Fig. 3. Sufficient steel is used to resist the shear and direct thrust on the joint without dependence upon the middle-third section of concrete. The steel bars passing through the joint are protected by copper strips on either side of the center line of the arch. This type of construction is economical of material as compared with the monolithic or full-ring type in which the invert carries part of the vertical reaction. The arch was made three-centered so as to conform closely to the expected line of thrust. The only uncertainty involved in the analysis of the arch is in regard to the amount of horizontal pressure developed by the fill, and the reinforcement provided will take care of a considerable variation in the horizontal loads.

In the concrete cylindrical intake tower are four 24-in. gate valves, three of them on screened inlets that will allow water to be taken from the lake at different levels. The fourth valve is on the outlet pipe. Screening is provided on the outside of the tower, as shown in Fig. 5, where there are three 24-in. inlets protected by conical steel galvanized screens, dropped over conical frames and operated by copper cables from the platform of the tower. These are economical to install and simple of operation at any level of water in the reservoir.

From the outlet conduit the water flows through a 27-in. welded steel pipe

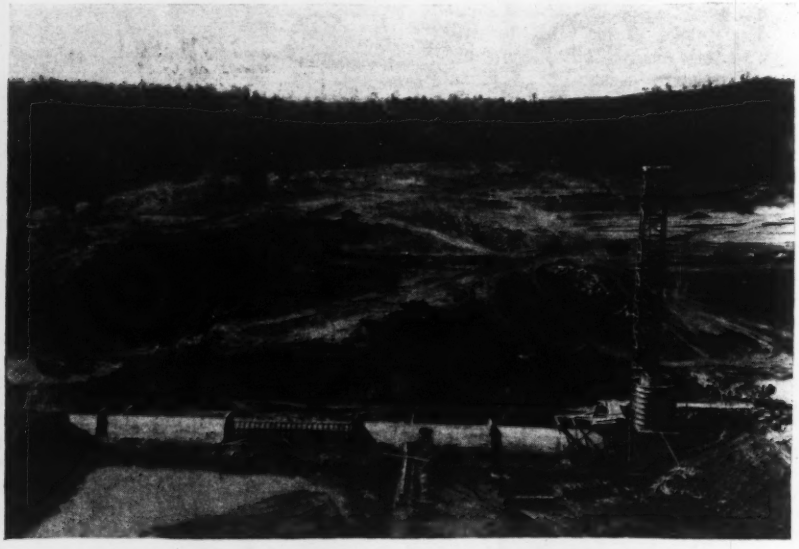

FIG. 6—OVERBURDEN stripped from the site was combined with other impervious material and placed in the downstream (left) portion of the dam below the cutoff walls. The outlet conduit and intake tower are shown under construction.

FIG. 7—CONCRETING the arch-barrel diversion conduit that passes under the dam.

approximately a mile south to the rapid-sand filter plant. Coagulation is to be obtained by the use of lime and ferric chloride, the latter manufactured at the plant from chlorine and iron filings. Ammonia and chlorine treatment will be used when necessary, and the water will receive final chlorination before leaving the plant. Complete mechanical mixing equipment is provided for a 30-min. mixing period. The two settling basins provide a detention period of six hours. The water flows in at one end and out at the other through perforated walls designed to distribute the flow evenly through the basins. A 200,000-gal. reinforced-concrete tank on a hill back of the plant will furnish washwater for the filters. The clear well is a reinforced-concrete covered reservoir with 1-m.g.d. capacity. A hydraulic turbine operated by the water coming into the plant through the pipe line will supply all the power and lights for the plant and power for pumping the washwater.

From the filter plant, which is at El. 800, the water is delivered by gravity through a 23-mile line of 27-in. steel pipe to the city limits at El. 440. At this point the cast-iron mains carry the water into the city system, and by means of pressure-reducing valves in the 24-in. cast-iron line a part of the water is carried by gravity to the 3-m.g. reservoir on Crow Hill at El. 710. The latter will serve the new high-level residence district. Part of the water flows to the 11-m.g. reservoir on Bailey Hill at El. 564, from which the business district and the older residence districts will be served. These concrete reservoirs are a part of the present waterworks system of Fort Smith but will be covered under this present project. The gravity flow of the new system saves the city the expense of present pumping to the low-level areas and repumping to the high-level services.

Welded steel pipe line

The pipe line is designed to deliver 10 m.g.d. to the city. Welded steel pipe, 27 in. in inside diameter and 5/16 in. in thickness, is used for the whole line. The steel plates for the pipe conform to the standard specifications of the American Society for Testing Materials, serial designation A-89-33, grade B, flange quality. On one half the line the specifications were open to concrete pipe, cement-lined cast iron and welded steel with bituminous enamel lining. The other half of the line is through rough country with several treacherous river crossings, and bids were received on welded steel pipe only for this section of the line.

The pipe is delivered to the job in 40-ft. lengths; it is being jointed in part with Dresser couplings and in part with welding. At creek crossings and in the river valleys the entire length of the crossing is welded into one length, and long expansion sleeves are placed at either end of these long sections.

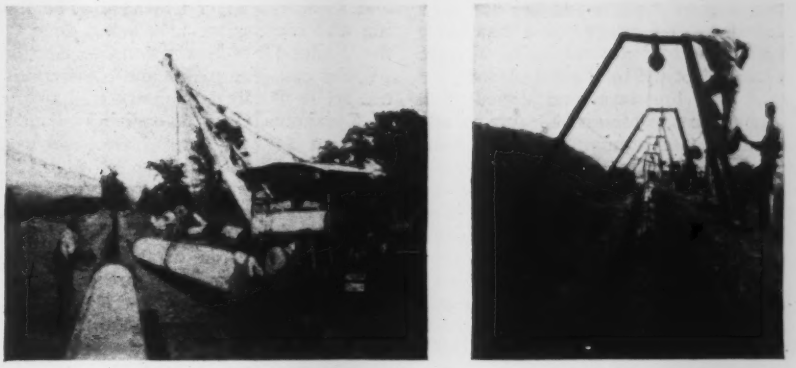

FIG. 8—PIPE-LAYING PROCEDURE, showing how 40-ft. sections were placed over the trench, welded together, and then lowered to grade from steel A-frames.

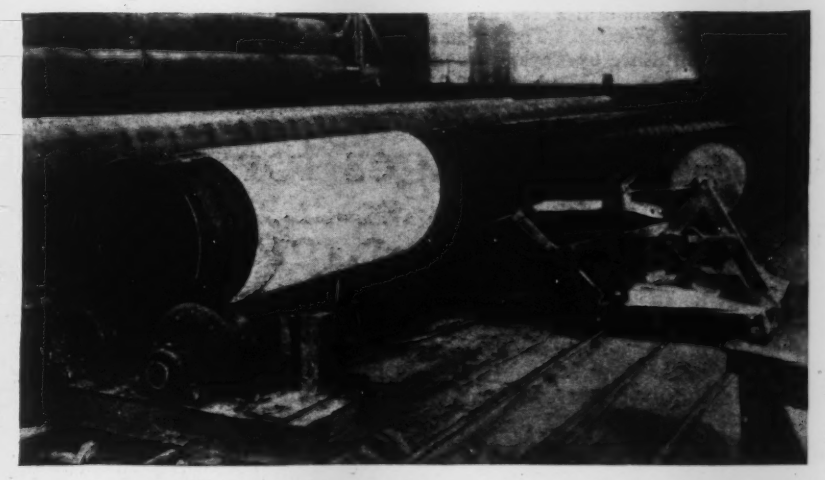

FIG. 9—PIPE WAS WRAPPED with mica-dusted felt so that slippage due to temperature change may take place without scraping off the bituminous coating.

Under the creek the rock is excavated, and the pipe is laid in the trench and backfilled with concrete. As a railroad and the pipe line follow the stream together through rough and changing country, there are seven railroad and nine creek crossings. Under the railroad a 32-in. steel culvert of ⅜-in. plates was jacked through the fill and the pipe line pulled through it.

The pipe line crosses the Arkansas River on an existing bridge designed for combined railroad and highway use. The 27-in. pipe, here made of ⅜-in. plates, is suspended under the west highway section of the bridge, the upstream side. Because theoretically the Arkansas River is still supposed to be navigable at this point, provision had to be made for uncoupling the pipe line at the drawbridge in case any vessel should use the river. Permanent working platforms are suspended under the two ends of the lift span of the bridge, and long-sleeve couplings are installed at these points. At one end of the bridge the pipe line passes through the abutment; at the other it is fixed to it. There are couplings every 40 ft. of the bridge length, so that the pipe line may expand and contract with the bridge.

In order to preserve the carrying capacity of the pipe line, a lining of hot bituminous enamel is placed on the inside of the pipe by a centrifugal process in the factory. After the lining cools, the pipes are spun again and the hot bituminous enamel is applied to the outside of the pipe. Over this coating is placed a wrapping of unbonded 35-lb. rag-felt coal-tar-saturated pipe-line felt, applied spirally and sealed at laps by a hot solution. Field touch-up work consists of repairing the lining after welding, coating and wrapping the welded joints or couplings and repairing any coating or wrapping damaged in shipping or handling. Experience with steel pipe in the oil fields has led to the adoption of the unbonded wrap as the best means to prevent the movement of the pipe in the soil from damaging the coating, since the pipe slips through the wrapping in expansion and contraction and the coating therefore is not rubbed against the fill that surrounds it. To facilitate this slipping, the pipe wrapping is coated on the inside with mica.

In order to reduce the water hammer to a minimum in this long line of pipe, six automatic control valves are installed at intervals along the line. These

valves float in the line and are designed to cut down the surges to a minimum and also to close automatically in case of a major break in the line below the valve. The line is also equipped with 2-in. combination air and vacuum valves at all important summits, and with 8-in. blow-off valves in important depressions. Except for the Arkansas River bridge crossing, the pipe line is entirely buried in the ground, the minimum cover being 2½ ft.

The work was let in four sections: section I (dam, filter plant, roads and bridges) to M. E. Gillioz of Monett, Mo., at a contract price of $543,195. The filter-plant construction has been sublet to W. R. Grimshaw and Co., of of Tulsa, Okla. Sections II and III, the 23 miles of steel pipe line, were let to William Bros., of Tulsa, for a total contract price of $746,226. The welded steel pipe is furnished by Taylor Forge and Pipe Works of Chicago. The lining and coating work is being done by the Wailes-Dove-Hermiston Co. Section IV, the cast-iron mains and connections, are let to B. & M. Construction Corp., of Oklahoma City, comprising about 3 miles of 24-, 20-, and 16-in. cast-iron pipe for a contract price of $110,137. The pipe is furnished by the American Cast Iron Pipe Co., of Birmingham, Alabama.

The construction of this new water supply, which is a PWA project, is under the supervision of W. R. Holway, consulting engineer of Tulsa, Okla., who made the surveys and prepared the plans and specifications. Victor H. Cochrane, of Tulsa, was associated with Mr. Holway in the design of the structures. W. T. Barry, of Fort Smith, is resident engineer on the project, and C. S. Young is the PWA resident engineer inspector.

Cast-Steel Hinges for Long Concrete Rigid Frame

High compressive stresses that would result from a fixed base on unyielding ground are reduced by hinges in a 100-ft. barrel-type span at Canton, Mo.

By Alvin B. Auerbach
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A BARREL-TYPE concrete rigid-frame bridge recently completed by the Rock Island District of the Corp of Engineers, U. S. Army, at Canton, Mo., departs from usual practice in the use of hinges of cast steel in its footings, to reduce the high compressive stresses that would result from fixed ends. The bridge is founded on rock. Its clear span of 100 ft. is another noteworthy characteristic, since this makes it the longest barrel-type frame yet constructed. The only concrete rigid-frame bridge that is longer is the Martinez St. Bridge in San Antonio, Texas, of the rib type, which has a clear span of 101½ ft.

Original plans for the remedial works at lock and dam 20 on the upper Mississippi River called for a 110-ft.-truss bridge across a 75-ft. drainage ditch at the upper end of the guide walls of the lock, to provide access to the lock from the near-by city of Canton. Additional studies showed, however, that a concrete structure was economically sound, and certainly much more in harmony with the large concrete mass of the lock. They also indicated the desirability of a type of design that had a minimum depth of section at the crown, so as to reduce approach grades and provide a maximum opening for high-water level.

The result was the selection of the barrel type of rigid frame, using a clearance of a little over a foot above high water at the crown. The rib type of rigid frame was investigated, but the necessity of designing for 2,000-lb. concrete gave ribs of excessive depth.

The bridge is designed for H-15 loading, using design stresses of 800 lb. per sq.in. for concrete and 18,000 lb. per sq.in. for the reinforcing steel. The stress analysis was made using the method of moment distribution of Prof. Hardy Cross, the elastic constants of the members being found by the "column analogy." The bridge has an elastic span of 105.88 ft., and was designed as an unsymmetrical rigid frame due to the variation of the rock levels. The span was given a 70-in. rise, using a parabolic intrados, with a crown thickness of 30 in. and an effective radius of 100 in. at the haunches. The width of the barrel is 23 ft.

Earth loads were taken at 33.3 lb. per cu.ft. for dry earth, and 83.3 lb. per cu.ft. for saturated earth. For dry-earth loading it was assumed that the fill might shrink away from either side and produce unsymmetrical loading and accompanying sidesway. Temperature and shrinkage effects were included.

Probably the most unique feature of this bridge is the use of steel-casting hinges in the footings. Moments induced at the top of the abutment walls by the main girder tend to produce a rotation of the base, and this rotation is prevented by the unyielding character of the limestone foundation. To avoid the high compressive stresses that would be caused by such a condition of base fixity, free rotation was insured by providing this special hinge. Investigation of the usual forms of concrete hinges showed that for a bridge of this magnitude there would be excessive stresses developed, and thus the steel castings were selected.

Although the resultant force at the base will not be constant under all conditions of loading, nevertheless the angular variations will not be large. The castings therefore are inclined to give pure compression under the most severe loading and only a slight variation from pure compression for unloaded conditions. The vertical reinforcing bars in the legs of the frame are used to increase the shearing resistance of the leg by appropriate bending.

The concrete was specified to be made

FIG. 1—LONGEST BARREL-TYPE rigid-frame bridge is this 100-ft. span structure at Canton, Mo., built by the army engineers in connection with the Mississippi River lock and dam work.

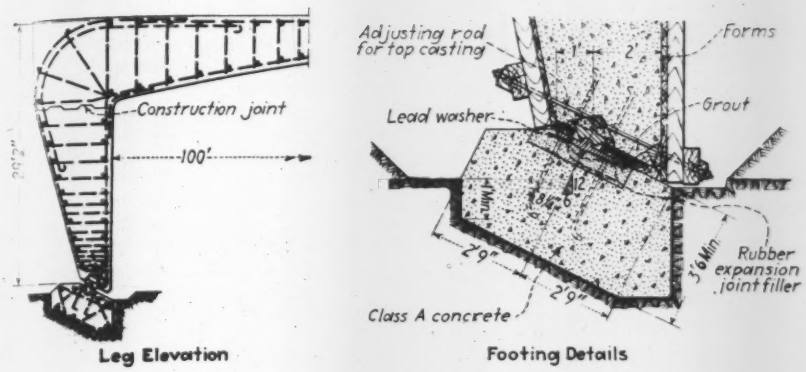


FIG. 2—CAST-STEEL HINGE SHOES on the Canton bridge insure rotation of the base under load, reducing stresses materially.

with 5½ bags of cement and 5½ gal. of water per cu.yd., the proportions of sand and coarse aggregate being varied so as to produce a workable mix. With the gravel used by the contractor, the resulting mix was about 1:2.5:4 and had an average strength of 4,000 to 4,500 lb. per sq.in. at 28 days. With the thin section used and the low permissible stresses, considerable steel was required, and the careful vibration of all concrete was deemed advisable, to insure proper placement. All forms were heavily braced to insure true alignment, and exposed faces were formed with wood fiberboard. The deflection of the span was computed under dead load and was cambered accordingly. Levels were checked constantly during the pouring of the main span, to permit the adjustment of wedges in the falsework and thus compensate for any compression of the timber posts.

One detail frequently overlooked is the reinforcement of the inside corner of the knee. Tests upon model frames have shown that the stress distribution here is distinctly non-theoretical, the neutral axis approaching the inside corner, and crushing resulted. Adequate steel was therefore placed in this region to transmit the loads around the corner.

The bridge was designed by the writer and checked by F. S. Brown, assistant engineer. The work was done under the supervision of E. E. Abbott, senior engineer, and constructed under J. H. Peil as resident engineer. Lt.-Col. R. A. Wheeler is the district engineer.

A. J. Boase, of the Portland Cement Association, furnished many constructive criticisms of the design. The general contract was awarded to the Perry McGlone Co., Kansas City, Mo., who sublet the bridge to Weldon Bros., Iowa City, Ia.

Coal-Mat Filters and Centrifuges at Niagara Falls Sewage Plant

AN INTERESTING DEPARTURE from the usual type of partial sewage-treatment installations is shown in the design adopted for the 90-m.g.d. plant at Niagara Falls, N. Y., where fine screens, adapted to function as filters with an anthracite coal mat, and centrifugal dewatering units for screenings prior to incineration comprise the principal treatment devices. The sanitary improvement program undertaken by the city is directed toward the abatement of pollution in the Niagara River, and includes, in addition to the disposal works, the construction of intercepting tunnels and diversion sewers. Financed by a PWA loan and grant, work has already been started on the project, estimated to cost $2,180,000.

The treatment plant is to be constructed between the Gorge Railroad tracks and the Niagara River on ground having a slope of approximately 40 deg. with the horizontal. This is the only practicable and economical site available. A master regulator and meter will automatically control flows up to a maximum of 90 m.g.d., limiting the rate of flow to the treatment plant. Flows in excess of this amount will be bypassed over weirs and discharged into conduits extending around the plant.

From the master regulator and meter outlet the sewage will flow into two grit chambers provided with mechanical scrapers and sand washers. These are designed for a maximum capacity of 90 m.g.d. The effluent from the grit chambers is discharged into two conduits leading to the screen and filter building wings to be constructed on either side of a central structure. In each wing there will be installed three 22-ft. modified Reinsch-Wurl screens, which will function either as filters or screens. When operating as filters there will be a superimposed anthracite mat, varying in thickness between 1 and 2 in., which will be used on all dry-weather flows up to 60 m.g.d. During operation as a filter with a coal mat, the brushing mechanism of the screens is raised so that the brushes skim the surface of the filter for removal of the retained solids. A small amount of the coal is removed with the sludge and screenings, and this will serve to support combustion of the moist solids.

During storm-weather flows in volume up to 90 m.g.d., the brushes will be lowered and the coal mat swept off to permit the screens to function as ordinary fine screens with ⅜-in. slots. The effluent from the two batteries of three screens is conducted into common effluent flumes, which discharge into six contact tanks. Chlorine will be applied in these tanks for the purpose of sterilization. Provision will also be made for pre-chlorination for odor control.

Sludge and screenings removed from the sewage will be discharged into pneumatic ejectors and pneumatically conveyed to sludge-storage tanks located in the central building. Here they will be dewatered by means of centrifugal clarifiers from an estimated moisture content of 80 to 60 per cent, a reduction in volume of approximately 50 per cent. The dewatered sludge and screenings with the mixture of coal will be discharged into incinerators for complete destruction.

Sewer construction

At the present time there are eight sewer outfalls from the city of Niagara River varying in depth between 15 and 120 ft. below the ground level on top of the escarpment. These outfalls are to be connected together by means of an intercepting-sewer tunnel approximately 18,000 ft. long, ranging in size between 5x6 ft. and 7x8 ft. The tunnel will be cut through rock. Flows up to 400 cu.ft. per second will be diverted to the treatment-plant site.

In addition to the intercepting-sewer tunnels, there are also diversion sewers to be constructed to carry cooling and rinsing water now being discharged into the sanitary sewer system. This flow, varying in volume between 30 and 40 m.g.d., will be carried by gravity to an existing ice shaft and there discharged into the hydraulic tunnel under the city that leads to the lower level of the Niagara River.

George L. Watson, of New York City, is consulting engineer for the Niagara Falls plant, and Philip B. Streander is designing engineer.

Chrome-Copper Steel Arch Spans 1,080 Ft.

Highway bridge in South Africa introduces a new alloy steel to large bridge service whose light weight was a considerable advantage at a frontier site in Rhodesia

THE THIRD LONGEST steel-arch bridge in the world was opened to traffic on Dec. 20, 1935, in South Rhodesia. Named the Birchenough Bridge in honor of the chairman of the Beit Railway Trust, whose funds built it, the bridge spans the Sabi River 100 miles east of Fort Victoria in a single arch of 1,080-ft. length and 216-ft. rise. The most notable characteristic of the bridge is its exclusive use of Chromador steel, a new British alloy product containing chromium, manganese and copper. Because of the high strength of this steel, a relatively small tonnage (1,500 tons) was required, which was advantageous from an erection standpoint, since the bridge site is in frontier country 80 miles from a railroad. It is claimed that the new high-tensile steel was also instrumental in keeping the cost of the bridge moderate and below that of any multiple-span type investigated. As noted, the bridge is the third longest steel arch, being exceeded only by the Sydney Harbor arch in Australia and the Bayonne arch in New York.

The bridge was built to give the people residing in the eastern districts access across the Sabi River to the central district of Southern Rhodesia. In addition, it was planned to open up to visitors one of the most beautiful mountain areas in Africa. Designed for highway traffic, the 5-in. concrete deck is 18 ft. wide and provided with a wearing surface of asphalt. There are two sidewalks, each 3 ft. wide, constructed of arsenically-treated teakwood 3 in. thick.

The arch itself is of two-hinged type and consists of two trusses spaced 45 ft. apart. These trusses are 46 ft. deep at the end posts and 37½ ft. deep at the crown. They rest on reinforced-concrete skewbacks which transfer their thrust to rock. Their design was made as simple as possible, to eliminate redundant members. Lateral bracing is provided in the planes of the top and bottom chords and as portal bracing between the end posts. Nearly all of the diagonal members of the arch trusses are the same length and of the same section.

The deck consists of *27* panels of 40 ft., suspended by wire cables from the arches. The width between the chords of the deck lateral bracing system is 48 ft. The cross-girders that carry the roadway are spaced 5 ft. on centers. There is an expansion joint in the deck two panels out from the west end and an articulated joint two panels out from the east end.

FIG. 2—LOCATION MAP of Birchenough Bridge site in Southern Rhodesia.

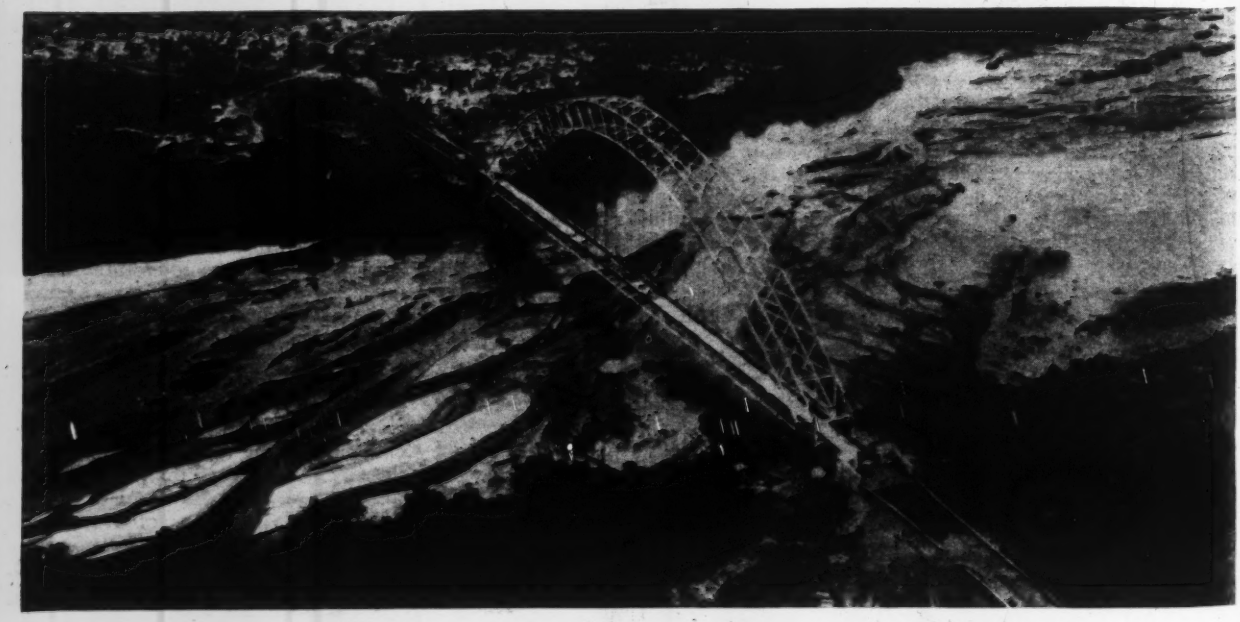
FIG. 1—USE of a 1,080-ft.-span arch for the new Birchenough Bridge in Southern Rhodesia avoided the necessity of placing foundations in the treacherous sands of the Sabi River. This new bridge is notable both for its long span and because it is built entirely of chrome-copper steel.

Alloy steel

The Chromador steel used in the bridge has an ultimate strength of 83,000 to 96,000 lb. per sq.in. and a minimum yield point of 51,500 lb. Its chemical properties are listed as follows:

Carbon	not exceeding 0.3 per cent
Manganese	0.7 to 1.0
Chromium	0.7 to 1.1
Copper	0.25 to 0.50
Silicon	not exceeding 0.2
Sulphur	not exceeding 0.05
Phosphorus	not exceeding 0.05

All steel was rolled and fabricated in England, shipped to Africa and conveyed by railway to the end of the line. At this point the steel was transferred to trucks and specially designed trailers, which hauled it 80 miles through the bush to the bridge site. The maximum



weight of a shipping piece was 8 tons and the maximum length 50 ft.

The arch was erected as two cantilevers anchored back to steel grillages at the bottom of tunnels sunk 50 ft. into the rock. A cableway spanning the river transported the steel out to electric cranes traveling on the top chord of the arches. These cranes, one on each half arch, weighed 50 tons and had a capacity of 5 tons at 50-ft. radius.

Two different settings of the anchorage cable were required as the cantilever erection advanced. The first backstay consisted of seven $2\frac{3}{4}$-in. steel wire cables per truss attached to a pin at the end of the upper chord. This anchorage served until the cantilever had been extended seven panels, with the crane on the end panel. At this point the second anchorage was made by attaching six cables per truss to the panel point immediately behind the crane and removing the first anchorage. The second anchorage cables passed over the top of an 80 ft. mast behind the arch bearings; all necessary cable adjustments were carried out at the top of this mast. The anchorage cables were some of those previously used in erecting the Sydney Harbor Bridge.

To effect closure of the arch, the two cantilevers after they were completed were lowered onto pins set in the center of the top chords, lowering being effected by releasing the cables through hydraulic jacks at the tops of the masts. To insure that the two halves would meet to the correct line and level, a pilot pin of 4-in. square section was screwed out of the end of the upper-chord member on one side into a guide prepared to receive it in the opposite member.

With the arch then in a three-hinged condition, the remaining lower-chord members and the center panel of the lower laterals were erected, after which the necessary stress was jacked into the lower chords, to bring the arch to its two-hinged condition. The amount that the jacking joint opened under this stress was measured, after which shims were machined to the correct thickness and inserted.

As they returned down the arch, the creeper cranes erected the hangers and all of the available deck steel. These cranes were supplied with power from a diesel-electric generating set on either side of the river. They were hauled up the top chords of the arch by two hand winches on the crane carriage, the hauling ropes from the winches being attached to a temporary bracket bolted to the far side of the outer diagonal of the first panel erected. The cranes were lowered down the arch by their hoist, working through a pair of 40-ton blocks, the upper one of which was attached to the arch above the crane.

The Birchenough Bridge was designed by Ralph Freeman, of Sir Douglas Fox & Partners, who also designed and supervised the erection of the Sydney Harbor arch. Likewise, Dorman Long & Co. fabricated and erected the Birchenough arch, as it did the Sydney Harbor arch. The personnel used to erect the bridge consisted of about 30 Europeans and some 200 to 300 natives.

FIG. 3—AN 18-FT. CONCRETE ROADWAY, set between wind chords 48 ft. apart and suspended by wire rope hangers from the 216-ft. rise arch, is designed for the heaviest probable highway traffic.

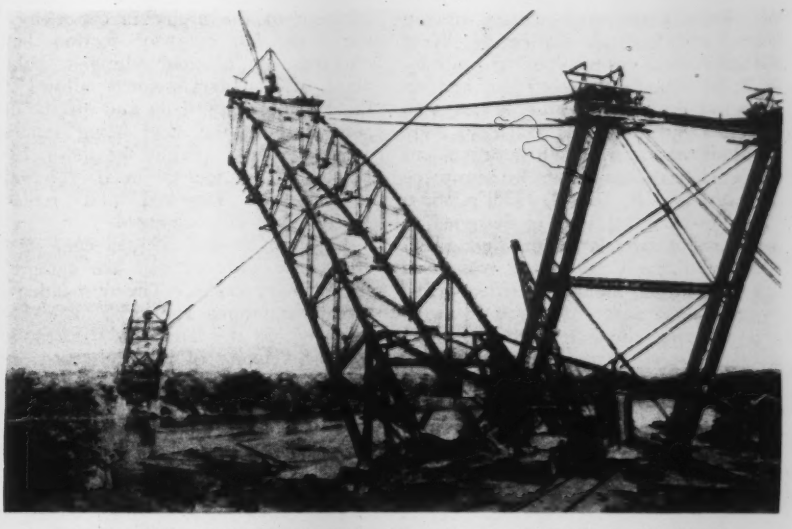


FIG. 4—ERECTION OF THE ARCH by the cantilever method utilized cable tiebacks passing over a temporary mast. Steel erection derricks received power from a diesel electric generating plant on either shore.

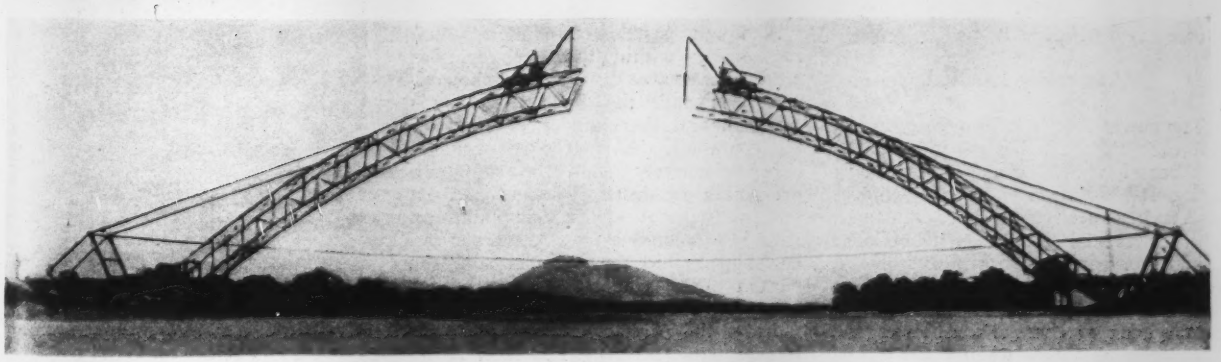


FIG. 5—APPROACHING CLOSURE, the 1,080-ft. alloy-steel arch frames some of the picturesque mountain scenery of the new territory that it brings nearer to civilization.

Portable Rock-Drill Dust-Control Unit Demonstrated in New York

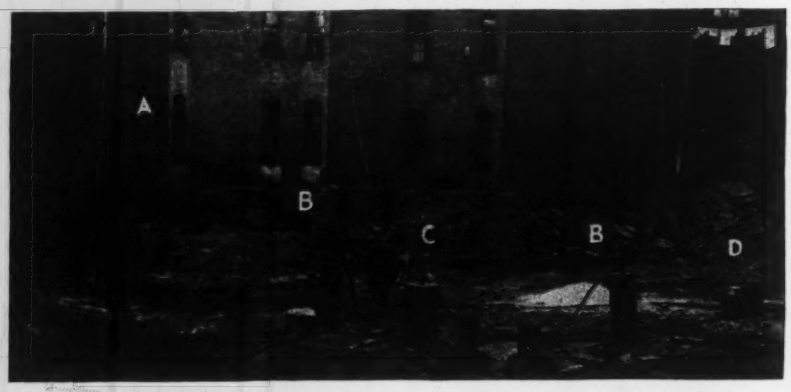


FIG. 1—FIELD ASSEMBLY of new-type portable drill dust collector. A—wagon drill; B—primary collector tanks; C—final separator tank; D—vacuum blower unit.

A NEW TYPE of rock-drill dust collector, the chief features of which are simplicity and portability, was recently demonstrated in New York City on a section of the New York Central Railroad's West Side depressed roadway being built by the P. T. Cox Contracting Co., and on several other jobs. The collector was developed by James H. Markley, New York contractor, and is an improvement of an earlier design shown by him three years ago (*ENR*, May 4, 1933, p. 563).

The dust-control unit is designed to take care of two large or four small drills. On the Cox job it was used with two wagon-mounted drifter drills. The principal parts of the unit are a hood covering the hole through which the drill steel passes, a preliminary settling tank which traps all the coarse dust and cuttings, a final separation tank containing bag filters and a rotary blower, powered by a gas engine, which supplies the necessary vacuum to conduct the dust away from the hole and through the separators. The various items are connected by lengths of 1½-in. hose. Two small or one large drill may be connected to one primary tank; one final separator and the blower will take care of two primary tanks.

Unit easily handled

The entire unit is extremely portable, and each item can be easily moved as the occasion demands. The primary tanks, 16x30-in. vertical steel cylinders of 3-cu.ft. capacity, weigh 88 lb. empty, while the final separator, a cylinder 20x30 in., carrying bag filters and a removable container of 1¼-cu.ft. capacity weighs only 90 lb. Mounted on a wheelbarrow chassis, the blower and gas-engine assembly weighs 250 lb. If powered by an air motor, this weight is reduced 120 lb.

The hood is a 6-in. pipe nipple with a 1½-in. tee connection, on top of which is a split rubber slab with wear plates through which the steel passes. A segment of the nipple is cut away on the side, the cutaway section being covered by a double-hinged rubber plate. This arrangement allows the hood to be snapped on and off the drill steel without the steel being removed from the hole, permitting the hole to be collared without the hood. The hood is instantly removed and replaced when the steel is changed.

Between 98 and 99 per cent of the rock dust and cuttings are caught in the primary tanks. The dust-laden air stream impinges against a cone baffle plate within the tank, and the resulting loss of velocity of the air causes most of the dust to drop. The top of the tank, to which the cone is attached, is fastened to the tank cylinder by means of a quick-acting toggle clamp. These tanks are made up of three parts: an open-end cylindrical body, a removable top to which the cone is attached and a bottom plate. The top and bottom plates are fastened to the cylinder by means of quick-acting toggle clamps with airtight rubber seals.

A tough pasteboard container that fits snugly within the steel cylinder retains the coarse dust. When the container is full, the bottom clamp is released, and the cylinder is lifted off the container. A pasteboard or metal cover effectively seals the container, permitting the dust to be removed from the job without spilling or exposure. In a few seconds a fresh container can be slipped into the cylinder and the bottom plate clamped on ready for operation.

From the primary separator the air stream, now carrying less than 2 per cent of the dust, is conducted by a hose to the final separator containing the bag filters. This tank is also fitted with removable top and bottom plates held in place by toggle clamps. An external shaker bar permits freeing of the trapped dust within the bags at desired intervals. The fine dust is shaken down into a shallow pasteboard container that can be removed at will and effectively sealed for disposal.

Portable blower unit

Mounted on skids, to which a wheel similar to a wheelbarrow can be at-

FIG. 2—EFFECTIVENESS of the collector is shown by these three views: Top—Dry drilling without dust hood in place. Center—Dust hood held above the drill holes. Bottom—Drilling with the dust collector in operation.

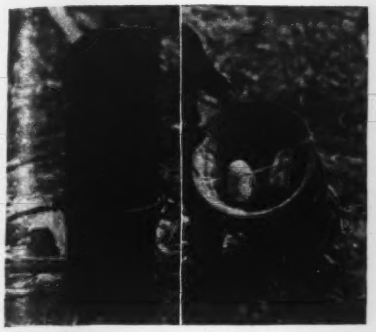


FIG. 3—TWO TYPES of collector tanks. At the left is a primary separation tank showing the cone baffle. An interior view of the final separator, a bag filter, is shown at the right.

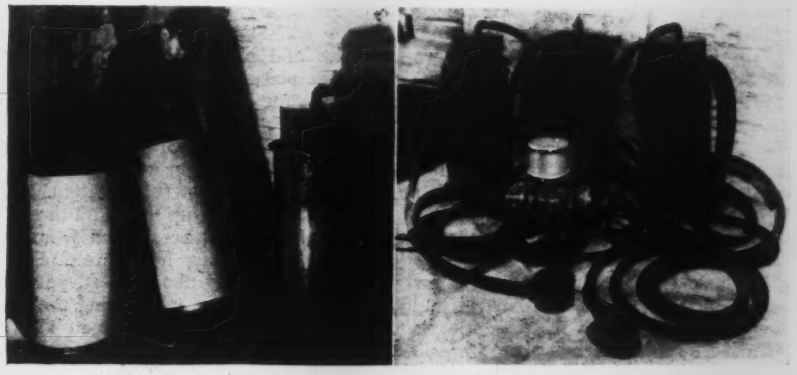


FIG. 4—PAPER CONTAINERS receive the coarse dust in the primary separator. At the right is an assembly of the whole equipment, vacuum blower, two primary separators, one final separator and the quick-detachable hoods.

tached at one end if desired, are the blower and engine. The unit is powered by a 1½-hp. gasoline-engine belt connected to the rotary blower. The blower creates a vacuum of about 4½ in. of mercury and discharges from 150 to 200 cu.ft. of air at 1-lb. pressure. Air or electric motors can drive the blower.

The unit, known as the Markley Dust Control System, is now being produced commercially. Besides the portable units, larger units are available.

Tunnel Progress at Parker Dam Aided by Large Drill Jumbo

A JUMBO with working platforms at three levels and mountings for nineteen drills has facilitated progress in the twin diversion tunnels of 32-ft. diameter now being driven around Parker Dam site on the Colorado River. The jumbo is mounted on an old Marion "60" power-shovel chassis and has standard-gage trucks. The working platforms are at three levels, and at each level there are wings on either side which fold down when the jumbo is to be moved. This makes the width of the unit such that it can be sidetracked to pass other equipment.

At the forward end of the jumbo a vertical rectangular framework of piping is fastened to the timber frame in such a way that drill mountings are available at all desirable locations. The horizontal bars on which drills are mounted are 4-in. extra heavy pipe and are arranged with swivels on the verti-

FIG. 1—REAR VIEW of jumbo at Parker Dam tunnel face. Note chute for hoisting materials in left center. Top wings are slightly narrower than those below.

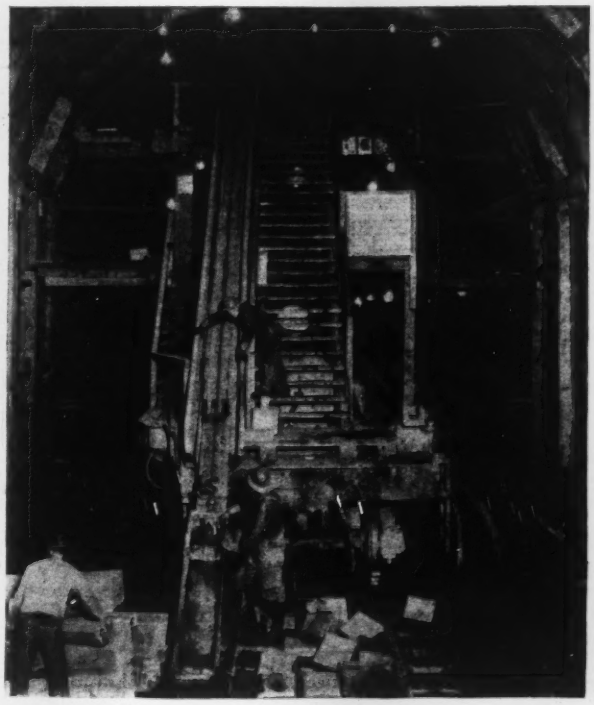
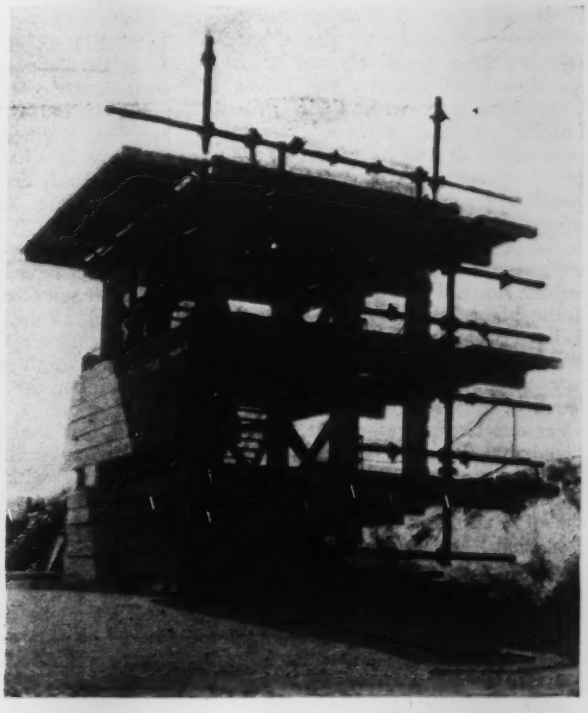


FIG. 2—FRONT VIEW of jumbo with two of the six wings folded down. The drill mountings at the sides swing back to give clearance for passing.



cal column so that the bars swing back parallel to the carriage for moving. Despite the fact that 90 to 100 holes are drilled in each round, the drill mountings are so arranged that the entire face can be covered without lifting any drills. Each drill covers about five holes by swinging on its arm and sliding along a bar. Not all of the drills are operated at the same time. The rounds average about 12 ft. in depth.

Access to the upper-platform levels is by a plank stairway wide enough for two workmen to pass. Drill steel and other materials sent to the upper levels are raised by a power hoist operating in a chute or slide alongside the stairway. For work at the crown of the arch trestles and planks are placed on the topmost platform.

A heading crew consists primarily of ten miners, eight chuck tenders and two nippers. The same heading crew places the timber sets, which are 12x12 in. in section set on 6-ft. centers. The plumb posts are set up first, and the segments of the arch are placed from the jumbo after drilling has started. Progress has averaged about 25 ft. per day for the two headings, including the timbering, which has been put in all the way thus far. In the latter part of January the diversion tunnel excavation was about 55 per cent complete.

Only one jumbo is required for the two tunnels; a combination battery and third-rail, 13-ton locomotive moves the jumbo from one tunnel to the other. The sequence of operation in the twin bores is arranged so they rotate in convenient order. Two 2-cu.yd. standard electric shovels are kept on the job in order to avoid the necessity for moving a shovel from one tunnel. This was believed to be economical even though shovels are not required in both headings simultaneously. Muck is hauled out in 10-cu.yd. dump cars.

An Economic Evaluation of the Effects of City Smoke

ECONOMIC LOSSES ranging from $10 to more than $30 per person per year may be attributed to the ravages of smoke in some of our larger cities, according to an article in the Public Health Reports for January. The statement, prepared by J. E. Ives and R. R. Sayers of the U. S. Public Health Service, for the hearings on the bill for smoke control in the District of Columbia, indicated that these losses are incurred through extra expense in laundry bills, repairs to soiled residences, ruined merchandise in stores and increased lighting costs due to diminished daylight.

It was stated that besides these losses, which affect the pocketbook directly, the literature on the subject discusses the injury of smoke to plants, shrubs and trees along the streets and in parks. The deposit of soot on the leaves of plants interferes with their growth, plugging up the stomata or minute pores of the leaves by means of which they absorb the carbon dioxide from the air, to convert it into sugar, starches and carbohydrates. The soot also coats the leaves and reduces the amount of sunlight reaching them, and in this manner slows down the rate of growth of the plant. Experiments carried on at Leeds, England, indicated that the growth of lettuce, for instance, in the very smoky districts was only one-fourth of that in a clear district.

Various investigators, it was reported, have shown that both daylight and ultra-violet light are absorbed by smoke. The health department of the city of Baltimore found from 1926 to 1928 that the amount of ultra-violet light was 50 per cent greater in the country than in the city, due to the absence of smoke. The department of health of Chicago found losses of 51 to 43 per cent of the ultra-violet light in that city on smoky days. During the Mellon Institute survey, H. H. Kimball found the ultra-violet light to be 60 per cent less in Pittsburgh than in Sewickley, a small residential town 12 miles to the northwest of Pittsburgh. The U. S. Public Health Service found an average loss throughout the year of 21.5 per cent of daylight in New York due to smoke in the atmosphere. In Baltimore the average loss of daylight amounted to 14.1 per cent. On some days the loss is greater than 50 per cent.

In Washington during the years 1932 to 1933, smoke and dust were deposited at the rate of 296 tons per square mile per year, of which 54 tons were carbon and 142 tons ash. Some figures on the amount of dust deposited per square mile per year at various places are given in the following table, which accompanied the report.

TABLE I—SETTLED DUST PER SQUARE MILE PER YEAR IN AMERICAN AND FOREIGN CITIES

City	Year	Tons
Pittsburgh, Pa.	1912–13	1,031
Salt Lake City, Utah	1919–20	250
Grafton, W. Va.	1922	1,876
Cleveland, Ohio	1927–29	780
Baltimore, Md.	1928–29	1,800
Washington, D. C.	1932–33	296
London, England	1910	58 426
Leeds, England	1910–11	25 539
Glasgow, Scotland	1910–11	1,325
Manchester, England	.....	240
Hamburg, Germany	.....	345 690
Osaka, Japan	1928–29	278

Gasoline Storage Tank Floated to New Location

FACED with the necessity of moving a 330,000-gal. gasoline storage tank, 40 ft. in diameter and 35 ft. high, a distance of 150 ft. to a slightly higher location, engineers for a Canadian oil company in Charlottetown, Prince Edward Island, decided upon flotation as the quickest and most economical method.

Although this method of tank relocation is not new in itself, the permeability of the soil offered an unusual problem, inasmuch as the new foundation was to be 9 in. higher than the old, which required a high degree of accuracy in determining the proper depth of water for flotation.

The first step was to prepare the new foundation by filling, grading and finally by topping with a 2-in. layer of clean gravel. An area around the tank in its original location and extending beyond the new site was then enclosed in earth embankment. Since, after filling the enclosure with water the new foundation would be hidden from view, three pieces of 4-in. steel pipe were driven in the ground, outlining one-half the tank circumference; these, projecting above the water, acted as guides to center the tank on its foundation.

It was determined that 27 in. of water would be required to float the tank 10 in. off the ground, or enough to land on the new foundation. Owing to the swampy nature of the ground and the resulting heavy seepage, and also because the water pressure was low, it was decided to place the necessary water in the tank itself. By opening the main 6-in. tank valve and also the 2-in. water-drawoff valves, the water was then emptied into the diked enclosure in eight hours. The 2-in. water drawoff connections inside the tank were carried as close to the bottom of the tank as possible, so that a hand pump connected to the outside valve could remove all of the water. When the tank was empty, twelve men, four on each of three sets of ropes, pulled the tank to its new location in about 20 min. It was necessary that the tank be moved slowly so as not to create a heavy surge of water that might scour the new foundation or breach the dike. The relocation operation was directed by C. Scrymgeour, engineer for Imperial Oil, Ltd.

Expansion-Joint Action in a Concrete Balcony

Daily readings for three months after pouring provide a record of movement that justifies spacing of joints used in Fort Myer riding hall

By Carl B. Gerber
Structural Engineer, Office of the Constructing Quartermaster, Washington, D. C.

IN BUILDING a new riding hall at Fort Myer, Va., an opportunity was taken to find out just what happens in the way of expansion and shrinkage in a concrete structure during and after construction and under changing weather conditions. The record obtained at one of the two expansion joints observed is presented in this article, which describes the procedure followed and sets forth the conclusions reached.

The structure in which the observations were made is a concrete balcony running around three sides of the 100x200-ft. riding arena. Expansion joints 1 in. wide are located about 40 ft. from each end, with 265 ft. of balcony between. The balconies across the ends of the building are 135 ft. long and contain one construction joint but no expansion joints. There are also two construction joints in the side balcony between the expansion joints, to divide the concrete into yardages that could be placed in one day and enable the re-use of the forms.

The expansion joints are of premolded type 1 in. thick. Each joint was arranged between a duplicate set of columns and supporting beams, the front wall, the intermediate column and the rear column being cut through to the footing, which is about 3 ft. below grade on hard yellow clay and gravel. The fireproofing on the structural-steel column at the rear of the balcony was also cut through and a mastic coating applied to the structural steel, to permit the concrete to slide. The joints also extend through the exterior 12-in. brick wall to prevent cracking of the masonry built integral with the rear supporting beam of the balcony.

To determine the movement in the concrete balcony, round markers made by filing reinforcing rods smooth were set in the beam on either side of the joint. Pairs of markers were installed in the bottom, center and the top riser beams. Each marker extends 12 in. into the concrete and projects about $\frac{3}{8}$ in. About ten days intervened between the placing of the first and second markers of a pair. As soon as the second marker was set, measurements were recorded, beginning twelve hours after pouring started.

Measurements were made each morning and evening from Aug. 28 to Dec. 27, using micrometer calipers measuring to 0.001 in. Three separate readings were taken at each set of markers and averaged.

Adjacent to the second joint observed, a thermometer was also inserted in the beam, to measure concrete temperatures. The readings are recorded along with the corresponding air temperature in Fig. 2, which is the plotting of the movements of this particular joint. In addition to the movement plotted, some visible opening and closing of the construction joints occurred during the more severe changes in temperature. Also some initial shrinkage in the concrete occurring during the first 24 hours of setting was lost before the first measurement was possible; further, it is to be noted that the concrete on one side of a joint was ten days old before measurement started.

Assuming the measured movement to be affected by a 60-ft. length of the concrete balcony, the calculated change of length for a 40-deg. drop in temperature would be $0.0000065 \times 40 \times 60 \times 12 = 0.1842$ in. The stress in the concrete, if no joints had been used, would amount to 500 lb. per sq.in., or

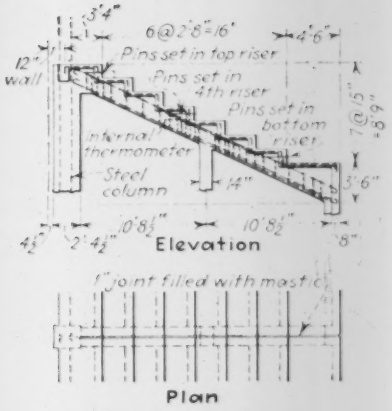


FIG. 1—ONE of the expansion joints in the concrete balcony around Fort Myer riding hall, showing location of marker rods for measuring movement and of thermometers for determining concrete temperatures.

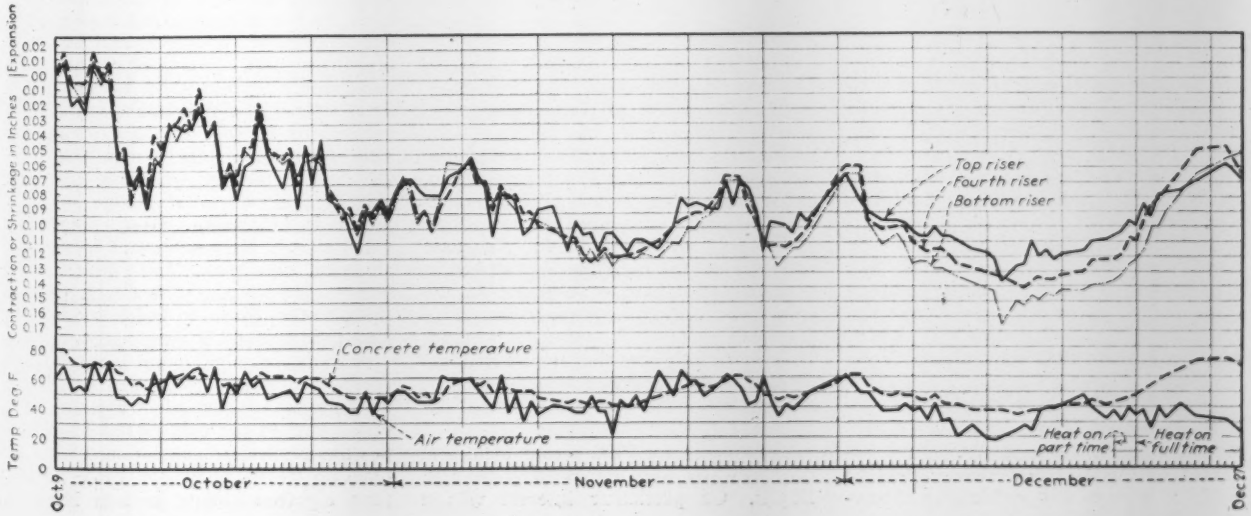


FIG. 2—DAILY RECORD of joint movement and temperature. The section on one side of the joint was poured Sept. 26, that on the other side Oct. 8, and the record begins on Oct. 9.

a stress of 12½ lb. per degree change in temperature. This stress is based on the formula $S = \frac{dAE}{l}$, in which d is the deformation, A the area, E the modulus of elasticity and l the length. This observed stress would be very close to the theoretically calculated stress of 13 lb. per sq.in. for a temperature coefficient of 0.0000065 and a modulus of 2,000,000.

It will be noted from the chart of the readings and the temperatures that the concrete was extremely sensitive even though the temperature of the mass of the concrete was rather slowly affected by the change in atmospheric temperature.

Since the 500 lb. per sq.in. stress existing as indicated by the movement greatly exceeds the probable 300-lb. tension value of the concrete, it is concluded that cracking would result to relieve this stress if no joints had been provided.

This new building was constructed from plans prepared by the Office of the Quartermaster General and built under the supervision of Major W. A. Danielson, Constructing Quartermaster of the U. S. Army.

Illinois Society Celebrates Its 50th Anniversary

Special review program, large attendance and distribution of awards marks semicentennial meeting of the Illinois Society of Engineers

A PROGRAM OF REVIEWS of 50-year developments in certain lines of engineering was arranged to give special significance to the 50th annual meeting of the Illinois Society of Engineers, held at Urbana, Ill., on Jan. 30-31 and Feb. 1. The society was organized at the University of Illinois (Urbana) in 1886, as the result of a movement initiated by the late Professor Ira O. Baker. At the dinner tendered to the past presidents, a number of whom were present, a large bronze plaque commemorating this founding of the society was presented to the university and was accepted in an address by Dr. Harno, dean of the College of Law.

At this dinner meeting there were addresses by Daniel W. Mead, president of the American Society of Civil Engineers; A. N. Talbot, first secretary of the Illinois society; and E. E. R. Tratman, its secretary for 21 years. The three speakers were all past presidents of the Society. Engraved certificates of honorary membership were presented to John W. Alvord (absent), A. H. Bell, J. W. Dappert, Jacob A. Harman, Daniel W. Mead, Emil Rudolph (absent), A. N. Talbot and E. E. R. Tratman. The medal awarded annually by the Illinois Society of Engineers for the best paper read at each annual meeting was presented to William E. Stanley, of Chicago, for his paper on "Cost Considerations in Engineering Design," which was read at the 1935 convention.

Water-supply developments

In a review, "Fifty Years of Waterworks Papers," Daniel W. Mead referred to the early erroneous ideas as to the amount of self-purification of sewage in running water and the relations of water supply to public health. In pumping machinery, the greatest development has been the introduction of large centrifugal pumps and turbo-electric drive for high-duty pumping. As to deep-well pumps, a cause of inefficiency is likely to be a disregarded change in water elevation to a level below that for which the machine was designed. A large cause of low efficiency and high cost in waterworks operation, in Mr. Mead's opinion, is the hesitancy of men in charge to call in expert assistance, this condition being particularly prevalent in municipal plants, where the officials would probably look on such action as an indication of inefficiency on the part of the man they put in charge.

Mechanical or "rapid sand" filtration is an American invention, the first municipal installation of which was at Somerville, N. J., in 1885, according to a paper by Charles B. Burdick, Chicago. The growth of filtration has been enormous, the number of plants being now nearly 2,000, most of them of the mechanical type. Illinois, with 78 plants, ranks next to Pennsylvania and Ohio, but several of our larger cities (including Chicago, New York and Boston) still supply unfiltered water. Adequate pretreatment has been demonstrated to be essential. Sulphate of alumina is the principal coagulant, though the iron-and-alum process is extensively used. It is curious to note that the mechanical filter was not developed by an engineer, but was conceived by machinists and put upon the market by business men.

Treatments for eliminating taste and odor in water were reviewed by John B. Baylis. Of particular interest was a paper reviewing changes in the standards of purity for drinking water, written by A. M. Buswell, chief of the Illinois Water Survey. In 1880, when the National Board of Health began a study of various tests for detecting pollution in water, the germ theory of disease was generally accepted, and early attempts to correlate bacteriological examinations with the chemical data resulted only in discouraging routine work in this line. But the main problem, the identification or detection of human fecal pollution, still remains unsolved. The chemical attack on this problem was abandoned 30 years ago, and attempts at a bacteriological solution have reached a stalemate position.

Sewers and sewage disposal

Personal experiences as a young engineer on sewer design and construction were given by John W. Alvord. It was stated that at one time there were more or less secret formulas for sewer design, and the engineer's chief difficulty was the necessity of modifying his cherished formula in order to meet the pocketbook conditions of his clients. Construction was a matter of men and muscle; machinery was practically unknown. The wellpoint system for drying wet running sand was not introduced until 1904, at Gary, Ind., and in such material before that time it was a battle to get in a good masonry bottom. Although Colonel Waring did a great work in advocating the separate system of sewerage, he created a strong prejudice in the public mind about dangers of "sewer gas" as a cause of disease, and it took a long period of education to turn popular opinion to the theory of bacterial infection.

Reviewing sewage treatment in Illinois, it was pointed out by W. D. Hatfield that many of the old plants were left to operate themselves, and sanitary engineers did not at first realize the necessity of continual and careful attention. A great impetus to sewage-works construction was given by state legislative acts providing for the formation of sanitary districts, for the raising of funds by bond issues, and for a separate tax to pay for the bonds and to cover operating costs. Exclusive of the treatment facilities furnished by the Sanitary District of Chicago, about a million persons in Illinois are now served by sewage-treatment plants, of which 700,000 are served by efficiently operated plants. Utilization of sludge gas for power is increasing. Regarding activated sludge, it is important to recover all solids and grease and convert them into gas and power. Of particular value is the attention given to keeping complete long-time records of plant operation.

A somewhat similar but more detailed review of sewage treatment in Illinois was given by Langdon Pearse, who stated that 44 per cent of the communities having sewers (excluding Chicago) have no treatment works, while no less than eighteen county centers have no

sewers. The first plant in Illinois was at Pullman (now a part of Chicago), where a sewage farm was laid out by Benezette Williams in 1881. At present there are 196 plants, in operation, representative of all types, including 62 municipal septic-tank installations. Of 24 plants using the activated-sludge process, eight use diffused air and sixteen employ mechanical aeration. This process is utilized by about 33 per cent of the population served.

The value of research in sewage treatment was discussed by Harold E. Babbitt, professor of sanitary engineering at the University of Illinois. An appraisal is difficult to make owing to the number of persons and places involved and the striking coincidences in the development of like processes in independent and remote localities. In many cases no one individual discovered the process, but several have built successively upon the findings of others until a complete process has been perfected. Laboratory work has made probably the greatest contributions. The original septic tank was built by Professor Talbot in 1894, and the late Professor Bartow commenced the laboratory studies of the activated-sludge process in 1913. Supplementary to the development of sewage-disposal plants has been the emphasis on treatment of industrial wastes with resulting financial returns. Thus the expenditure of $41,000 for equipment at a paper mill reduced the annual fiber loss from $160,000 to $30,000.

Drainage and flood control

With its rich lowlands, Illinois has suffered severely from continual flooding along its rivers, and the protection and reclamation of these lands have been important lines of engineering work. In a report on the status of flood control in Illinois, by Lieut.-Col. R. A. Wheeler, Corps of Engineers, U.S.A., it was shown that about 50 per cent of the overflowed lands are included in reclamation projects. Some of these projects or districts have only ditches for surface drainage and are still subject to overflow; others have improved the stream channel and thus shortened the overflow period and reduced the flood heights; those which have levees are protected from outside floodwaters but are liable to damage from internal waters which accumulate behind the levees during flood periods, and the only complete protection is where levee construction is supplemented by pumping plants.

Agricultural drainage in Illinois began about 1875, according to W. G. Potter, of the Illinois division of waterways, when farmers started to dig ditches and lay tile drains. Unsystematic and independent patchwork development of drainage districts resulted in protected districts, often causing increased flow and the flooding of unprotected areas farther downstream. The state division of waterways is now working on a long-time program for improving all major streams upward from the mouth. This paper was supplemented by another on agricultural drainage and water conservation by Prof. E. W. Lehmann, showing that financial difficulties of the districts are due mainly to overcapitalization and lack of complete development. Steps are being taken to refinance such districts. About 94 per cent of the area of drainage districts is improved, 5½ per cent is useless for lack of drainage, and 4½ per cent is idle. Stream-gaging in Illinois, as reviewed by J. H. Morgan, U. S. Geological Survey, began in 1886, when the Sanitary District of Chicago installed a station on the Des Plaines River. In 1935 the state and federal governments expended a total of $29,400 for this purpose. Drainage and subgrade treatment as important problems for highway engineers were outlined by M. K. Lingle, Illinois division of highways. An interesting account of the work of the C.C.C. drainage divisions was given by John G. Sutton, district engineer. Illinois has six of the 46 camps maintained in nine states by the U. S. Bureau of Agricultural Engineering.

Roads and streets

Street widenings in Chicago, involving difficult problems, were outlined by J. A. Moore. Owing to lack of continuity of many streets, business streets on section lines have been selected usually for such treatment, although the work was more costly owing to the fact that the buildings were of the more expensive type and were built out from the original street line. Grade-separations at railway crossings have supplemented this work, and engineers are now trying to devise some means of providing continuous grade-separations of highways by elevated or depressed streets for high-speed traffic. The heavy cost of such works is one of the difficulties to be surmounted. A variety of old-style pavements tried in Chicago were described by John B. Hittell, chief engineer of streets, beginning with the corduroy (log) and plank roads, and then the round cedar blocks, macadam and cobblestones, as well as various patented and experimental constructions. More modern developments in street paving were outlined by H. J. Fixmer, who also pointed out the financial difficulties involved in the maintenance of an extensive street system.

Concrete paving for highways was traced by E. C. Wenger, of the Portland Cement Association, to the Wayne County work in Michigan in 1909, with Illinois following in 1912 and having now 12,000 miles thus paved.

Structural engineering

Progress in foundation theory has been almost entirely within the 50-year life of the society, as stated by Prof. N. M. Newmark. It was his opinion that the theory of soil mechanics, although still new, is sufficiently developed for use as a guide by the engineer. Following this, the structural development of high buildings was discussed by Albert Smith, who concluded that no tower in Chicago pays its proper share of interest on the investment even in the most prosperous times, and in depression years it contributes a disproportionate share of losses. An interesting historical and technical record of Illinois bridges, by W. J. Neubling, chief engineer of the Alton & Southern Railway, included those built before 1886 and then those from 1886 to 1936. Developments in tunnel construction were reviewed by H. J. Horan, and those in concrete work by Prof. F. E. Richart.

Surveying

This society has always given a large share of attention to the land surveyor and his work, and these mutual relations were discussed by Morris L. Greeley. Reminiscences of early experience were given by J. W. Dappert, whose first work was staking out the foundations for the State House at Topeka, Kan., in 1884. A paper by Prof. J. S. Dodds, University of Iowa, described his efforts to induce the U. S. government to publish the original instructions for the public land surveys, and Bruce B. Bort outlined the great differences betwen old-time land surveys and modern surveys of high-value property. Developments in transits and levels were reviewed by M. S. Jordan.

Engineers and public relations

In a review of registration of engineers, Prof. W. M. Wilson stated that 35 states have registration laws of some kind, and in five of the other states no attempt has been made to introduce such legislation. The existing laws are so diverse that the National Council of State Boards Engineering Examiners is working on a proposed uniform law. Engineering education was reviewed by Prof. J. O. Draffin, of the University of Illinois. As to the desirability of public relations of engineers, Robert I. Randolph was pessimistic and skeptical, since the public is fickle and the engineer is lucky to have a job while "some low-brow elected to public office makes the deals, splits the commissions and waves the flag at the dedication ceremonies." On the other hand, the extensive public-relations work of the Western Society of Engineers was enthusiastically described by Edgar S. Nethercut. A brief address on the place of the engineer in our social, economic and political structure was made by A. C. Willard, president of the University of Illinois.

The next meeting is to be held at Chicago in 1937. Officers elected for 1936 include: president, Paul E. Green, Chicago; vice-president, W. D. Jones, Chicago. The secretary is Harold E. Babbitt, Urbana, Ill.

Joint Fillers and De-Airing Interest Paving-Brick Men

Paving Brick Association meeting centers attention on the year's research in joint fillers and the physical properties of brick made from de-aired clay

WITH an attendance of about 120 and delegates from nearly all of the 40 company members, the National Paving Brick Association held one of the most successful of its thirty annual meetings in Columbus, Ohio, during the last three days of January. Increasing business and the extended research activities of the last year (particularly in the new product—de-aired brick) gave snap to the proceedings. The past few years have seen the association turn to scientific research in a way comparable to that followed by the most advanced of the construction materials trade organizations. During the three days of meeting two days were spent largely in considering research reports on joint fillers and on de-aired brick and in visiting field and laboratories where experimentation is in progress.

Filler research extended

Laboratory research reported a year ago (*ENR*, Feb. 21, 1935), to evaluate various joint-filler materials and select a number for trial in the actual construction of a test road, was extended in 1935 to a study of experience in application of the selected fillers in building the test road. The results, as reported by H. Z. Schofield, director, N.P.B.A. Research Bureau, showed that all of the fillers could be applied but with varying degrees of ease. This was true also of eight other fillers used for various reasons on short sections (50 ft.) in addition to the thirteen fillers selected primarily for field study.

Test Road Construction—The test road, 1¼ miles long, has a 6-in. concrete base 20 ft. wide with a flush center curb 6 in. wide and two flush side curbs 9 in. wide. The cushion course, except two short sections of plain sand, was asphalt mastic composed of 94 per cent warm dry sand and 6 per cent asphalt (naphtha) cutback. The cushion was placed 1 in. thick and rolled to ¾-in. thickness; both base and cushion were finished to templet. The cushion, after a few hours, set hard enough to support a man's weight. The bricks were 3-in. wire-cut, vertical-fiber, side and end-lug brick, laid directly on the mastic and rolled; after rolling, the surface was fog-sprayed with a non-bonding solution of 35 per cent calcium chloride, 1 per cent starch and 64 per cent water. In respect to spraying the report said:

> By using great care it is possible that the separating fluid can be sprayed onto the brick top only. On this construction, which was probably average, the separating agent was certainly seeping into the joints.

Incidentally, it is to be noted, said Mr. Schofield, that heavy loading (coal haulage) is applied in one lane of the road so that filler behavior under light and heavy loading can be observed. Again one lane was surfaced in warm weather and the other in colder weather, making possible another filler-behavior comparision of the same filler. A side investigation is being made to determine temperature action; at one place a series of thermocouples are installed across the road, and for a year the temperatures will be taken in the center of a brick, in a joint, in the mastic cushion, at the bottom and top of the concrete base and in the subgrade at depths every half-foot from 6 to 30 in.

Filler Application—The purpose of the test road is to permit of long-time observation of filler behavior; so far only behavior in application has been determined. The results are very briefly summarized as follows:

1. Two Asphalt Fillers — Softening point plus 75 deg. C.; penetration 30-40; one of semi-asphaltic base and one 100 per cent asphaltic base; both applied at 450 deg. kettle temperature. Smooth liquid produced which filled joints perfectly; surplus readily removed and re-used; brick surface left clean.

2. Two Grout Fillers—One grout was a 1 cement 4 sand mixture, and one was 1 cement, 2 asphalt emulsion and 3 sand. Both were mixed in a concrete mixer with water to grout consistency, flooded onto the pavement and squeegeed by hand into the joints; joints were filled completely, and only a thin film was left on surface.

3. Two Plasticized Sulphur Fillers—One, a plasticized sulphur containing a mineral aggregate was tough to cut in removing surplus and showed susceptibility to injury when kettle temperatures exceed 320 deg. F. The other, a blend of sulphur and asphalt, removed as easily as straight asphalt fillers. Both filled the joints perfectly.

4. Two Blended Asphalt Fillers—One a 65 per cent semi-asphaltic base and 35 per cent 100 per cent asphaltic base producing a higher softening point (101 to 110 deg. C.) and a lower penetration (26 to 32) mix, and one this same blend with 20 to 30 per cent powdered mineral matter added. Both filled completely and the surplus was removed readily.

5. Asphalt Mastic Filler—Mastic of 60 per cent asphalt and 40 per cent sand poured and squeegeed. Removed easily at leather stage but soon afterward was tough to cut. Difficult to prevent segregation of sand and asphalt.

6. Two Asphalt Fillers—One a semi-asphaltic base and one a 100 per cent asphaltic base both with 85 to 96 deg. C. softening point and 25 to 35 penetration. Both applied and removed readily. (Compare with No. 1.)

7. Natural Lake Asphalt Filler—This asphalt had a softening point of 50 to 60 deg. C. and a penetration of 42 to 47 and contained 20 to 32 per cent of naturally incorporated inorganic material. Entered joints well, but surplus became tacky and then tough and smeared in removal.

8. Special Pitch Filler—Asphalt with 5 per cent asbestos poured thick and curdy, but joints filled under squeegeeing. Adhered to brick and surplus could not be removed cleanly.

Discussion—No question could be made of the observations of the report on facts of application, said R. R. Litehiser, chief engineer of tests, Ohio highway department. In brick construction, however, he felt that expansion joints need particular attention to assure that the joint in the brick surface will be in exact vertical plane with the joint in the base. W. V. Buck, Bureau of Public Roads, considered that some better test should be made to determine brick quality. Too much brick paving now shows brick failures. W. W. Duecker, Mellon Institute, told of increased perfection being obtained in the quality of plasticised sulphur in the Institute laboratories which promises a perfected joint material.

De-airing still debatable

Besides the joint-filler studies, association research has continued during 1935 into the properties of de-aired brick. In this study the laboratories of the Bureau of Public Roads have worked with those of the Paving Brick Association in a joint investigation covering determinations of abrasion, adsorption, specific gravity, and bending and compressive strengths. The report on these tests was made by F. H. Jackson, senior engineer of tests, Bureau of Public Roads. As the investigation is only partly completed, Mr. Jackson reported progress only with a statement of general indications but no final conclusions.

Briefly, samples were selected from nine factories of de-aired and of standard factory product, and each of the factory sample lots was divided into equal numbers of soft, medium and hard grade brick. The tests made were for abrasion, specific gravity, absorption and flexural strength. In general the

methods of testing were those of the A.S.T.M., except that abrasion tests were made in three ways: by the standard rattler, the Los Angeles rattler and the Deval process. The several hundred results were compared and cross-compared in some score or more tables and graphs. This study pointed to the following indications:

1. That rattler loss is reduced somewhat by de-airing.
2. That flexural strength is not increased by de-airing.
3. That the quality of the brick as measured by both the Deval and the Los Angeles abrasion tests is improved by de-airing.
4. That the bulk specific gravity is slightly increased and the absorption is reduced by de-airing.
5. That the uniformity in quality of the product is not improved by de-airing.
6. That there is no definite relation between transverse strength and rattler loss.

The report laid emphasis on the tentative character of these indications and urged that they should not be regarded as final conclusions from this series of tests and much less of what the de-airing process might offer in brick quality as it is further developed.

Discussion—Formal discussions were presented by four brick-plant technicians and by Dr. G. A. Bole, Ohio State University Experiment Station. In general, the remarks of the plant technicians indicated a questioning attitude toward the conclusions.

T. C. McAvoy, Jr., McAvoy Vitrified Brick Co., said that a process which reduces kiln discards to a few per cent was one not to be lightly condemned by test figures. Wayne Barrett, Purington Paving Brick Co., and G. R. Robinson, Hocking Valley Brick Co., pointed out that analyses of the test figures were possible that made a better showing of results. A more general viewpoint was taken by R. B. Keplinger, Metropolitan Paving Brick Co.

It was to be remembered, said Mr. Keplinger, that the brick tested was 1934 product and was presumably not fairly representative of present quality of a material so new and being rapidly improved as manufacturers learned more of the effect of the kind of raw materials and of the processing operations of drying, burning and cooling. Experience had been very limited because de-airing was very new and because since its introduction output had been small. It was probable that as experience was gained the control of processing would have to be kept within narrower zones. But de-airing was a promising development and should be given a thorough production study.

Dr. Bole proved to be the enthusiast about de-airing; he stated that he not only believed in it but he considered it one of the greatest if not the greatest advance made in clay products manufacture. This did not indicate, he said, that we knew all that was needed, instead there must yet be made a long and careful study of de-airing processes and particularly of paving-brick structure. In this connection it is to be noted that G. R. Robinson, of the Hocking Valley Brick Co., urged that research should be extended beyond present Bureau of Public Roads and brick association tests to investigation of raw materials, of de-airing vacuums, de-airing machines die shapes and pressures, etc.

Upkeep and reconstruction

Based on a total of 214 miles or 3,800,000 sq.yd. of brick-paved streets in Columbus, Ohio, city engineer P. W. Maetzel gave the following figures of cost of maintenance for ten years 1924-34:

Year	Cost Per Sq.Yd. Pavement Maintained	Cost Per Sq.Yd. Total Pavement
1924	$1.92	2.5c.
1925	1.82	3.6
1926	1.91	3.4
1927	1.88	3.15
1928	1.84	4.18
1929	1.76	5.1
1930	1.61	5.9
1931	1.72	5.8
1932	1.61	1.4
1933	1.94	1.8
1934	1.82	1.1
Average	1.80	3.4c.

These costs cover pavements up to 48 years old, and the cost of 3.4c. would be considerably reduced if figured over the life of the pavements. Defects are chiefly failures of base and wear of brick; repairs consist in removing brick, restoring base, replacing cushion and relaying brick, turning them where necessary. In turning, where considerable variations in depths of cushions are required, it has been found that limestone screenings make a more stable bedding course than sand. In the many years various kinds of bases have been used; the present recommendations are: 6- to 8-in. concrete base built by finishing machine or to templet; ¾-in. cold-mix mastic cushion; repressed or wire-cut lug brick; asphalt filler with excess removed from the surface.

In discussion G. M. Anderson, chief engineer of maintenance, Ohio highway department, stated that the department had 1,437 miles of brick road, or about 14,000,000 sq.yd. and, averaged over a period of five years, the maintenance cost had been 3.2c. per sq.yd. but the cost per square yard was maintained from $3.50 to $5.50. Some explanation of this difference, Mr. Anderson thought, might be in character of structure and repairs, length of haul, width of road and the fact that instead of patching complete restoration was undertaken in each repair operation.

In this line of restoration interest was shown in a program of progressive resurfacing described by M. T. Del Beccara, Bureau of Streets, Chicago. In the last five years about half of the mileage of streets in the Loop district of Chicago formerly paved with creosoted wood blocks has been resurfaced with concrete, asphalt or brick. This resurfacing has been a piecemeal process; in the case of brick an area of defective wood block is removed, the concrete base is leveled up, a cushion course is placed, and the brick is laid and filled. The edges of this brick patch, which is often irregular in shape, merge into the wood block still in place. As other areas of block become defective they are resurfaced with brick until finally, by progressive substitution, a whole block or street has a new brick pavement.

Commenting on the use of brick in the manner described, the paper stressed the time and cost elements. A brick replacement can be opened for traffic as soon as completed; no setting or curing period is required before the street can be opened for traffic, which counts heavily in congested streets as are those of the Loop district of Chicago. In figuring the cost of construction this time element has also great importance, as expressed in hours of labor and cost of equipment. Brick resurfacing reduces the time element to the minimum and so reduces labor and equipment hours.

Besides the city work described, Chicago has a brick-street relaying program under way as a relief-works measure. As described in a paper by M. J. Morrissey, W.P.A. engineer, the procedure is as usual, taking out and cleaning the old brick, restoring base and cushion and relaying the turned brick; the notable feature is that operations have been continuous through the winter, which would have been impossible with almost any other type of paving.

The notable use of brick for repaving the Manchester Bridge in Pittsburgh, Pa., was described by city engineer Henry D. Johnson, Jr. This bridge, completed twenty years ago, was first paved with wood blocks on a concrete base, and then in 1927 asphalt was substituted for the wood blocks except in the streetcar-track zone. Wood blocks and asphalt were slippery, and in 1935 repaving with a non-skid surface was decided on. The surface repaved was 1,091 ft. long and 36 ft. wide, and brick on concrete base was the construction selected primarily because with non-skid qualities it provided a renewable surface particularly desirable in the streetcar-track zone. A distinctly modern structure was adopted—concrete base, 3-in. vertical fiber, wire-cut lug brick and ¾-in. mastic cushion. Construction followed usual practice in exact finish of base and bedding course and in using a separating agent for removing surplus joint filler. A rather low average abrasion loss of 22 per cent was specified, and a quite unusual maintenance guarantee was written into the contract as follows:

> Prior to the expiration of the guarantee period (five years), wherever the concrete foundation is found to be defective, the entire pavement, including the concrete foundation, shall be taken up

and relaid. Any brick which becomes soft, unsound, broken or disintegrated, shall be replaced with new brick. Wherever the surface of the pavement becomes uneven on account of defective material or by wear of the brick, or by settlement of the pavement, or any other causes, and shows a variation of ½ in. or more from the general surface of the pavement as determined by a 4-ft. straightedge placed in any position on the surface of the pavement, the contractor shall remove the brick and relay the same with sound materials to the proper line and grade.

The total cost of the new pavement was $22,360, and the unit costs were $2.55 per sq.yd. for brick surfacing and $11 per cu.yd. for concrete base.

PWA and FHA stress records

Closing the sessions, papers were presented by H. B. Hackett, assistant administrator of PWA, and Chas. C. Anthony, Federal Housing Administration, giving the records and nature of the work performed and in progress. Outlining the purpose and scope of PWA operations, Colonel Hackett summarized the performance under federal administration as follows:

As for distribution of projects, PWA has one or more in 3,067 of the 3,073 counties of the United States; 15,500 federal projects totaling $1,562,000,000, and 3,896 non-federal projects totaling $1,295,000,000 were undertaken under the Recovery Act of 1933. The grand total is 19,396 projects, totaling $2,857,000,000; to date 15,897 projects are completed which have cost $961,000,000.

Under the Work Relief Act of 1935, 4,168 non-federal projects totaling $749,000,000 were approved, and 95 per cent of the total cost is now under contract or the projects are out for bids. In addition to these projects, the Housing Division of PWA is constructing 50 low-rent housing developments totaling $129,725,000, of which 96 per cent is under contract or in construction. In all, PWA has disbursed $630,000,000 for ascertainable wages, and $1,213,000,000 for materials, the greater part of which of course goes into pay envelopes of those who produce the raw and finished materials.

Referring to the work of FHA, Major Anthony stated that naturally the paving brick branch of the clay-products industry was less directly connected with housing operations than were other branches, but increased housing inevitably brought better streets and pavements.

Letters to the Editor

The Title "Engineer"

Sir—In an editorial in the issue of Jan. 2, p. 25, you take exception to a proposal recently adopted by the National Society of Professional Engineers, namely that we endeavor to establish the custom of identifying members of the engineering profession by using the designation "Engineer" or the abbreviation "Engr." before their names instead of Mr. or other title. Permit me, as the originator of this suggestion, to present some of the considerations that prompted it.

The first underlying thought is our campaign against the confusing use and abuse of the designation Engineer by others than members of our profession. The proposal under consideration is only part of a larger program to develop and strengthen, in the public mind, an exclusive association of the desigation Engineer with the membership of our profession. The individual engineer has invested many years of his life in professional training in order to qualify. The profession is investing decades of united effort to win public recognition and esteem for those who bear the title. All of this investment is largely nullified if we do not stake out our claim to the designation Engineer and endeavor to establish for it an exclusive professional connotation.

A second motivating thought is that we cannot expect the public to hold the designation Engineer in high esteem unless we ourselves show that we are proud of it. We must show that we value this distinguishing designation as other learned professions prize and protect their professional appellations.

A physician is proud of his designation "Dr." It is invariably used in referring to him and in addressing him and, without selfconsciousness, he applies it to himself. The medical profession is jealous of this professional designation and is vigilant in guarding it against unauthorized use. It is a violation of the medical practice laws for men unlicensed thereunder to use the designation Dr.; an exemption is regretfully made for those who have had the degree or title of Doctor legally conferred on them in other fields.

The New York State law governing the practice of medicine provides that it shall be unlawful for any person unlicensed thereunder "to use the title Doctor or any abbreviation thereof in connection with his name or any trade name . . . unless duly authorized *by law* to use the same."

The use of such distinctive professional designation has a definite value in emphasizing the fact that, by study and training, he has attained full professional status. American usage furnishes plenty of precedents for the use of prefatory designations substituted for the commonplace prefix of Mr. Besides, such professional designations as Doctor and Counselor, we observe such titles as Senator, Congressman and Governor; General and Colonel, Dean, Professor, and Doctor. For engineers the designation Engineer, uniformly applied, will be far more convenient and significant.

I do not take exception to your thought that there are other more important means of attaining public recognition for our profession. I fully recognize the importance of public education concerning the profession, of raising the standards of qualification and service, and of participation in community interests. As you know, all of these things are included in the program and activities of the National Society of Professional Engineers and its constituent state societies and county chapters. But any such program to increase public respect for engineers is incomplete or partly nullified if that term is not impressed upon the public as the distinctive designation of our profession instead of being left to indiscriminate application and connotation.

You ask, "Just who is it within the field of construction that is to be distinguished by the title Engineer?" The answer is obvious—only the engineer. Our proposal (and it seems strange that it should need to be defended) is that only members of the engineering profession should be designated as engineers.

Formerly there was no way of defining the engineering profession or of establishing a clear-cut line of demarcation to distinguish the engineer from the non-engineer. Now, following the precedents of other learned professions, engineer registration laws have been enacted in 35 of our 48 states, covering over 90 per cent of the engineers of this country. These registration laws supply the long-needed solution of our problem. In the 30 or more states having comprehensive registration laws for engineers, no individual is an engineer, or a member of the engineering profession, unless he is registered under the law. The prerequisites for such registration include qualifications of moral character, evidence of completion of academic and professional education, an additional number of years of training in apprenticeship on engineering work, and the passing of professional examinations.

The mere possession of a degree or membership in a voluntary society does not confer professional status. Achievement or prominence in the fields of research or business does not make a man a physician, or an attorney, or an engineer, unless he has been legally admitted to such profession.

Our registration laws, regretfully, contain some exemptions under which non-engineers are legally permitted in certain conditions to do work of an engineering nature. Such exemptions, however, do not make these individuals engineers.

I fully appreciate your text: "By their works ye shall know them." As you say, "A few engineers will be known by the great monuments they have helped to

build." That thought is sufficient under a profession's attitude of every man for himself. It was that attitude that resisted the engineers' registration movement in its earlier years. The profession, however, has now come to a realization of the value of organized effort for the benefit of all—for the advancement of the profession as a whole in public service and in public recognition.

The establishment of "Engineer" or "Engr." as a distinctive designation may appear comparatively unimportant, but it should be conceived as a part of a larger and more significant program. No one is required to follow the suggestion unless he desires to do so; but I, for one, am proud to be addressed by my friends and fellow-engineers as—

ENGR. D. B. STEINMAN,
President, National Society of Professional Engineers.

New York, N. Y.,
Jan. 6, 1936.

OUR EDITORIAL of Jan. 2 undertook to express the view that the engineering profession will best define and characterize itself through its performance and its bearing, not through outward insignia, and that self-assumed titles are more apt to have an undesirable effect than to prove helpful. This view necessarily conflicts with those set forth in the above letter as the motive for attempting to introduce "Engineer" as a title of address.

While we attempted to give our statement some background of reasoning, the issue after all is one that will be determined by good taste rather than by argument. Obviously, it is one thing to don a title but quite another to have the world accept and recognize this title in any but a derisive way. For the present, then, it is enough to say that if such a title practice is likely to conflict with the general sense of fitness, as we believe to be the case, it is better not to think seriously of establishing it. —EDITOR.

Puzzolanas in Concrete

Sir—Dr. Scripture in his article "The Possibilities of Puzzolanas in Mortar and Concrete" (*ENR*, Oct. 24, 1935, p. 563) regards their potentialities for "improving concrete" with favor. Further, he concludes that "at the present time sufficient information is available to permit the use of puzzolanic admixtures and puzzolan cements with confidence." He states that the improvement effected by their use "can and may" make concrete more durable in three ways: by decreasing volume change, by increasing resistance to corrosion, and by increasing resistance to freezing and thawing.

Dr. Scripture's belief in respect to volume changes that "The net effect of puzzolanic action is to decrease the final shrinkage" is not borne out by Davis, Kelly, Troxell and Davis, (*Journal*, American Concrete Institute, Vol. 7, Sept.-Oct. 1935, p. 80). They found that, "The contraction of mortar upon drying is greater for the portland-puzzolan cements than for the corresponding portland cements." They also found that portland-puzzolan cements produced mortars having higher coefficients of thermal expansion than were obtained with the corresponding portland cements. With respect to freezing, and thawing, they concluded, as a result of experimentation, that, "No pronounced difference in absorption is apparent between concretes containing the various portland and portland-puzzolan cements."

Dr. Scripture finds: "There has been little agreement on methods of test and standards for evaluation" of puzzolanas but still believes there is sufficient information available at the present time to permit their use with confidence! He briefly mentions that the Los Angeles Aqueduct "seems to have failed to give complete satisfaction due to the use of an unsuitable puzzolana." Such may be the case. It is nevertheless interesting to read the paper "Tufa Cement as manufactured and used on the Los Angeles Aqueduct" (*Transactions* Am.Soc. C.E., Vol. 76, p. 520, 1913). Therein it is evident that the idea prevailed at the time of construction that a suitable puzzolana was being used. Also therein European puzzolanic practices gave authoritative sanction to that which was about to be done.

With respect to the use of puzzolanic materials elsewhere, Dr. Scripture refers to "many successful structures in these European countries." Yet in Paper No. 100 at the XVth International Congress of Navigation, Vienna 1931, by M. Pierre Periani, Inspector Superior of Civil Engineers, Rome, Italy, there appears the statement: "A mere adding of portland cement to ground puzzolana is not sufficient to prevent the decomposition of mortar and concrete under the combined action of salts contained in the seawater. As a matter of fact, the Servola mole and many other deteriorated structures which we have mentioned above were built with portland cement added to puzzolana."

In this country, Miller and Manson (See *Technical Bulletin No. 358*, U. S. Department of Agriculture), used siliceous and presumably puzzolanic materials as admixtures in specimens tested in sulphate solutions in the laboratory and also in the field in the waters of Medicine Lake, S. D. On p. 68 appear the statements: "Of the nine siliceous admixtures tested, blast-furnace slag, trass, and volcanic ash are the only ones that definitely increased resistance." And "It is not seen how the puzzolanic activity . . . could have been used to predict the relative effect of the siliceous materials of this group on resistance of concrete to sulphate action. Therefore, it appears that, regardless of the methods used to determine the active properties of a puzzolana, justification for its use to increase the resistance of a portland-cement concrete must depend upon careful experimentation."

That Miller and Manson's caution to base justification for the use of puzzolana upon careful experimentation is well founded is borne out by their statement on p. 70: "Twenty per cent ash: [volcanic ash from Northwestern Nebraska] increased the resistance of laboratory cylinders more than 500 per cent, but lesser quantities had very little effect. Twenty per cent ash did not, however, increase the resistance of the cylinders exposed in Medicine Lake; on the contrary, it slightly reduced their resistance."

The logical reaction to such evidence of the action of puzzolanic materials would seem to be that the science has not yet progressed to the point where it is possible to predict service behavior with certainty from results of laboratory tests. Without detracting in any way from the splendid work done in the field of laboratory experimentation, there appears to be an unfortunate lack of a much-to-be-desired correlation between tests and experience. Surely there is warrant for caution and conservatism, or at least for controlled enthusiasms, in this matter of puzzolanic improvements.

BAILY TREMPER,
Materials Engineer, Washington Department of Highways.

Olympia, Wash.,
Dec. 3, 1935.

Zerbino Dam Failure

Sir—Dr. Probst, writing in your issue of Oct. 31, 1935, about the failure of the dam of Sella Zerbino on the River Orba in Italy, which occurred on Aug. 13, 1935, quotes from a book by Kelen some statements about phenomena of erosion which occurred during a high flood in November, 1928, in a diversion tunnel (Umleitung) of the power plant, and draws some conclusions about the nature of the rock on which the fallen dam was founded. I beg you to rectify that the statements contained in Kelen's book do not refer in any way to the dam of Molare on the River Orba but to the Mollaro Dam on the River Noce in the basin of the Adige.

M. VISENTINI,
Director, Ufficio Idrografico del Po.

Parma, Italy.
Jan. 7, 1936.

Proportional Weir in Grit Chambers

Sir—In the Dec. 19, 1935, issue of *Engineering News-Record*, an article describing the sewage-treatment works at Goshen, Ind., mentions a so-called novel feature of grit-chamber design—namely, the use of a proportional weir to maintain a constant velocity for all volumes of flow.

Your readers may be interested to know that exactly the same device, and for the same purpose, was designed by the writer almost twenty years ago, while a member of the firm of Hering & Gregory, for the grit chamber in the sewage-treatment works built at Albany, N. Y. The proportional weir at Albany is shown and described in an article by the writer, entitled "Grit Chamber and Pump Station, Albany Sewage-Works," and printed in *Engineering News*, in the issue of June 22, 1916, p. 1164.

JOHN H. GREGORY,
Consulting Engineer.

Baltimore, Md.,
Jan. 7, 1936.

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February 13, 1936

Costly Fishways

THREE AND ONE HALF MILLION dollars is being spent for fishways at Bonneville Dam on the Columbia River in the none-too-certain hope that salmon going up the river to spawn can get by that obstruction to their movement. The most serious thing about the whole undertaking is that no one knows whether this great expenditure or any part of it is really needed, nor how effective it will be. The claim that without an open Columbia River there can be no salmon is unproven theory. And since at best the amount of water that flows out through the entrances to the fishways will be but an insignificant part of the total flow past the dam and through the powerhouse, it is an open question whether any considerable number of salmon will find the fishways. The result of this uncertainty is evidenced by the ever growing demands of the fish interests for more and more elaborate facilities, demands that have increased the cost from $800,000 to $3,500,000 and have given the engineers no end of trouble in modifying the design of the dam and powerhouse to meet the changing requirements. This much can be said in favor of the present large expenditure; it may provide a laboratory in which the subject of fish movement past a power dam can be thoroughly studied. What is learned at Bonneville may save much needless future expenditure on the Columbia River because many other dams are proposed above Bonneville.

A Region and Its Water

IN A CONDENSED but comprehensive factual sketch of the Tennessee Valley operations that appears in this issue the engineering reader will find a simple view of that complex undertaking. If the program which this sketch outlines is fully considered, the many-sided bearing of the work on the physical betterment of the valley will be apparent. Its relation to soil fertility and conservation, to rehabilitation of agriculture and the many associated factors of human existence in the region will be seen to transcend its relation to power. The sketch further makes evident that, both because of its nature and because it is a long-time job, the Tennessee Valley work calls for national assistance and guidance. A point of special importance is that the undertaking necessarily centers around water; the Tennessee River is the thread that runs through the whole structure of the valley and binds together all elements of the improvement project. Thus the project becomes a natural function of the agency charged with responsibility for administering river matters, that is to say, the national government. Very likely a better way can be found to administer such an undertaking than the Authority system—something nearer to our accustomed governmental and administrative procedure. But on its record of 2½ years of accomplishment the Tennessee Valley Authority can claim rank with any other type of governmental agency in efficient discharge of duty. It is making a pioneer achievement in correlating the development of a major water resource with the welfare of the region served.

Tribute to Service

A WELL-MERITED TRIBUTE was paid to the memory of Elwood Mead and to the value of his long labors in western development by the action of the Board of Geographic Names this week in designating the inland sea formed by Boulder Dam "Lake Mead." The new name not only is a recognition of Dr. Mead's contribution to the building of the great river-control project but, in broader sense, symbolizes what he did to promote the progress of arid-land reclamation and the conservation and use of waters for the benefit of mankind. During the dozen years that Dr. Mead was at the head of the Reclamation Bureau the control of the Colorado River was his heaviest responsibility, and he gave his best efforts to carrying through the remarkable project that Arthur P. Davis had conceived years before. In surmounting the many serious administrative and technical obstacles that stood in the way of its execution his labors were of decisive moment. Assured of a place in history as one who played a leading part in bringing Lake Mead into being, he well deserved to have this major feature of the project given his name. Yet what he did in other ways for his generation rises far above that single contribution. His service to mankind in guiding reclamation along sound paths and in causing it to upbuild vigorous communities in the desert regions is the greater achievement that is recorded for posterity in the name Lake Mead.

A Milestone

EVEN IN A TIME when 50-year celebrations of societies, institutions and companies are everyday matters, such an event as the semi-centennial of the Illinois Society of Engineers attracts attention as a happening of note. In its way it constitutes a milestone of engineering development. It reflects continuity of purpose and stability of condition in one of the professional groups of the upper Mississippi valley to a degree that is unusual among state engineering societies—a field that has had a high mortality. Regrettable though it be, the state society in general lacks the strength of bond that holds together both the national society and the local engineering society. Its mission in life has generally been less obvious, and surely has been more difficult to organize and keep vital; yet it is not less important. The state society in fact is the natural unit of professional organization, for it brings together an engineering group that lives under one set of laws and is concerned with one broad set of natural and economic conditions. Technically as well as professionally, the engineer has close kinship with all his brethren in the state, and therefore the society in which they join has a prime function in cultivating those interests that assemble engineers into a group or class distinct from their fellow citizens. True, the past three or four decades tended in another direction; specialized groupings of engineers overshadowed the earlier comprehensive societies, in disregard of state boundaries. More recently, however, the trend has again changed toward emphasis on local community of interest and reinvigoration of the state engineering society is in sight. Such an outlook gives particular meaning to the demonstration of vigor that the Illinois semi-centennial affords. It should encourage all state groups to take up the work for professional advancement that is their responsibility.

Time for Serious Work!

BORN of wild rumors and fired by sensationalism, the hearings on Representative Marcantonio's resolution to investigate the fantastic charges of wholesale silicosis deaths on the Hawk's Nest tunnel have come to naught. In three weeks of shouting and arm-waving by members of a House labor subcommittee not a single item of evidence was produced to substantiate the charges, not a single ray of light was shed on the troublesome silicosis question. Fiery words, sarcastic comments, and a parade of such phrases as "village of the living dead," and "America's black hole of Calcutta" may blow up a nice bubble of political publicity but do nothing toward solving a great industrial problem.

There has been enough of the Marcantonio committee type of investigation. It is now time to forget Hawk's Nest, to call off the scandalmongers and to get down to real business.

Silicosis and kindred dust diseases present a grave and urgent problem to industry, including the field of construction. It is a problem old to some fields, new to others, yet neglected and minimized by all. Because industry in the past, through either ignorance or blindness, has refused to face the facts and recognize the silicosis hazard, a fertile field for legal racketeering and barratry has developed. As a result, the basic causes of the disease, its prevention, cure and compensation, and the requirements of legislation to control the silicosis hazard and relieve its burdens, have been overlooked by industry in frantic efforts to fight ruinous damage suits, a few of which are legitimate but many of which are conscious or unconscious blackmail.

But industry bears only part of the blame for failure to conquer silicosis. There has been no concerted action and no coordination of effort on the part of industry, labor and health services. There has been too much mere scratching around, too much spasmodic research, too many words thrown into the wind without purpose, and all too little concrete, tangible counsel and action. Mine or foundry owner, quarry operator and tunneling contractor can find millions of words on record on the nature of silicosis and its effect on the lungs, but precious little on what he can do in his own shop, mine or tunnel to protect his workers.

Rep. Marcantonio is seeking $5,000 to carry on his hearings. The demand is utterly absurd. Congress should appropriate 50 times this amount and initiate a real study of the practical aspects of silicosis. Let the study be headed up jointly by the U. S. Bureau of Mines and the U. S. Public Health Service, which agencies have made extensive and valuable studies of the disease. Let representatives of labor, industry and insurance be joined on the board that is to make the study of the many factors involved.

The study should be made with the sole idea of eradicating an industrial pestilence. The factors involved are numerous, complex and often vague. Out of this study should come a more secure knowledge of the cause of silicosis, of its development in relation to length of exposure to dust, of its power of disabling the victim. It should tell us, for the first time, of the prevalence of silicosis in various lines of industry and of the potential hazard in each. It should show what can be done in each industry to control the hazard and to prevent the disease, what dust-control systems and devices are applicable, and what is their efficiency and effectiveness. And finally, it should lay a foundation for sound, fair and adequate legislation to control the hazard and provide compensation.

Admittedly this is a tremendous task. It is too big for a House labor committee to handle; it is too big for the Secretary of Labor to conduct, as has been suggested, with the fairness and thoroughness the situation demands. It can be done only by an adequately-financed board that knows industry, industrial health hazards, silicosis, compensation and legislative control methods. But until such a study is made the fight on silicosis will be limited to sharpshooting by a few smart lawyers, harassing of a few firms with ruinous law suits, and occasional blasts from legislative halls in the form of unwise legislation. We have had enough of this. It is time for constructive work.

Alloy-Steel Trends

A HEIGHTENING of interest in higher-strength and lighter steels for structural purposes seems a probable development of the year just begun. Already a committee of the American Society of Civil Engineers has made an able survey and report on the subject of structural alloy steels. Next month a regional meeting of the American Society for Testing Materials will be devoted to the subject, and in the fall the Civil Engineers will discuss alloy structural steels.

Whether all of this well-directed effort will succeed in fostering a wider use of these materials is problematical, however, for there is a wide difference between what might be termed an educational meeting of the minds of user and producer and a commercial agreement involving the same parties. The user has always wanted to try out special steels on small structures and in small quantities, but the manufacturer, while willing to supply the steel, has often set his price prohibitively high. In some cases he has declined to make price concessions even on large tonnages, though continuing substantial tonnages, as in structural silicon steel, have usually led to economic prices. The user, on his part, has often lacked initiative in specifying new steels, or he has failed to examine their economic possibilities.

Today, manufacturers both here and abroad are devoting more study to high-strength steels than ever before. New American steels with 50,000 to 60,000 lb. yield-points have been introduced in which chromium, copper, molybdenum, manganese and nickel are used as alloying agents. Little if any tonnage of these steels, however, has gone into structures. In Europe some of these new steels, particularly those of chrome-copper content, have been accepted more readily. An article in this issue describes a 1,080-ft. steel highway arch built by the British in Africa in which all of the steel is of this type. The French have built three suspension bridges in Madagascar, each of which utilized several hundred tons of a similar steel. Denmark's great Storstrom and Little Belt bridges require some 40,000 tons. Corrosion resistance and light weight dictated these installations.

The present situation with respect to new alloy structural steels comes down to the facts that actual structures are available for inspection in Europe, that manufacturers in this country have new strong steels available at a price, and that American engineers are evincing a greater interest in the economic possibilities of these steels. As the year unfolds and these factors begin to emerge from the melting pot of discussion and study, there should result development of note.

CURRENT NEWS

Nebraska Power Suit Compromised

Counsel for PWA and Nebraska power companies agree on court order permitting work to be continued

THE District of Columbia Supreme Court, on Feb. 10, approved a restraining order which had been drawn up by agreement between counsel for the Public Works Administration and counsel for a group of Nebraska power companies, which had been seeking an injunction preventing the use of PWA funds for three Nebraska public power and irrigation districts.

In general, the order permits work to proceed on the three projects in accordance with the original plan but prevents the use of PWA funds for constructing the proposed transmission system which was to be set up to serve various communities in Nebraska. The order also prohibits the development of power on the Tri-County project but does not prohibit such development on the Sutherland and Columbus projects. The power companies point out that they are not attacking the projects as power developments, except on the production of power at the Tri-County project, but they do object to the formation of a single marketing agency. In December PWA and Bureau of Reclamation engineers studied the three projects and reported that they were physically sound but economically doubtful unless combined into a single power-marketing entity (*ENR*, Dec. 26, 1935, p. 898).

The general effect of the present court order is confined to any new plans which would require additional funds and not to previously approved grants. Under the court's restraining order PWA will be able to carry on with its work on these projects pending the trial on the merits of the case which will be heard April 20.

Representatives of the Northwestern Public Service Co., one of the complainants seeking to block PWA funds for use on the three Nebraska public power and irrigation districts, issued the following statement:

"If the Loup River or Sutherland District will sell power to us cheaper than we can make it, we will purchase power from them and immediately pass such savings on to our customers. Officers of these two districts have understood our policies from the beginning and have our power costs. The thing we object to is the building of federally financed distribution systems controlled in Washington which would destroy our property. We will give to our customers full benefits of any reduction in the cost of making electricity."

Jefferson Memorial Bill Approved by St. Louis

The board of aldermen of St. Louis, Mo., has passed, and the mayor has signed, an ordinance authorizing the immediate sale by the city of $2,250,000 in bonds to be used in connection with the development of the Thomas Jefferson Memorial project to be located on the Mississippi River. PWA has already allocated $2,250,000 and WPA has allocated $3,300,000 for the first unit of the work. Total estimated cost of the project is from $28,000,000 to $30,000,000, of which the city is to pay $7,500,000 and the federal government the balance.

Suits seeking injunctions to restrain the city officials from selling the bonds have been filed in the U. S. District Court. The suits alleged that the so-called emergency clause of the ordinance was a pretense designed to hinder litigation.

Canadian Contractors Claim Reduced By Court

A claim by the W. I. Bishop Co., and the Bank of Montreal, against the James Maclaran Co. of Buckingham, Que., has been greatly reduced in provincial courts, following the action taken in the Montreal courts and reported in these pages Jan. 9, p. 67. This second claim was in respect of the High Falls Power Development on the Lievre River, constructed between 1928 and 1930, the claim being that the contractor had been deceived by the contract plans into making too low a tender. In the superior court at Hull, on Jan. 29, Justice Archambault reduced the award on the claim to $2,860, the amount claimed having been $376,000. The case has been five years in litigation.

Unauthorized Army Projects Cut from Appropriations Bill

Five non-military projects begun by the army engineers as relief operations were not included in the bill when it was reported to the House by the appropriations committee on Feb. 10. The projects are the Passamaquoddy tidal power scheme in Maine ($9,000,000), the Florida Ship Canal ($12,000,000), Conchas Dam in New Mexico ($3,500,000), Sardis River Reservoir in Mississippi ($2,500,000), and Bluestone Reservoir in West Virginia ($2,000,000). The committee stated that none of these projects had been considered by Congress in the regular way in which such army engineer operations are passed upon and authorized, and that only two of them, the Bluestone and Sardis Reservoirs, had been favorably reported on by the Corps of Engineers in the so-called 308 river studies.

A total of $14,700,000 of relief-act funds has been allotted to these projects, and it is estimated that $219,000,000 will be required to complete them. In view of this fact, the appropriations committee stated that it did not feel that it should include the $29,000,000 necessary to continue the work in the army bill until the projects had been approved by Congress in the normal manner, but did not infer that the projects be abandoned.

PWA Projects To Be Expedited

Ickes plans to push program so that allotments cannot be recalled and diverted for relief needs

(Washington Correspondence)

PWA FIELD FORCES were called to Washington this week for conferences on ways of expediting the public works construction program. Various factors intervene to delay comparable progress between various states. Severe weather is a handicap, but this does not explain why projects in northern states, in some instances, are further advanced than in southern states.

Administrator Ickes' object is to build a record of performance that will become a testimonial for continuation of non-federal public works construction. He will follow through in the near future by publicizing widespread community demand for thousands of pending projects that could not be financed out of PWA's allocation from the 1935 appropriation. PWA's immediate purpose is to push its program into construction so far that allotments cannot be recalled and diverted to the WPA relief program.

President Roosevelt is planning to redistribute previous allocations from the $4,880,000,000 appropriation in order to reduce the amount of new money needed to carry on WPA until next fiscal year. The law permits him to allocate a maximum of $1,700,000,000 in loans and grants to states. Allocations made under this provision total approximately $1,171,000,000 to WPA and $343,000,000 to PWA. The balance was allocated for other purposes. How much the President may be able to recapture from PWA and other agencies is questionable.

PWA is protected by the fact that all of its funds are obligated either by offers or contracts covering loans and grants to municipalities. The President's policy precludes substitution of new projects for those to which allotments were made but fail of execution. This process has been practically completed, however, and it is expected that an attempt by the administration to withdraw funds at this late date will be met by court action instituted by the sponsors of approved projects. Bids have been called or contracts let for practically all of the 4,000 projects included in PWA's program. The volume of contracts which have been let or bids advertised totals $735,000,000.

Lake Mead Official Name of Boulder Dam Lake

The lake formed by the construction of Boulder Dam on the Colorado River was, on Feb. 6, officially named Lake Mead, honoring the late Dr. Elwood Mead, Commissioner of Reclamation. In announcing the action of the Board of Geographic Names, Secretary of Interior Ickes said, "It is altogether appropriate that this great

new geographical feature of the West should bear the name of Dr. Mead. He supervised the construction of Boulder Dam and he first envisioned the lake as a fine playground dedicated to the benefit and pleasure of the people of the nation. It is a fitting tribute to his large part in the development of the arid West."

Lake Mead began forming on Feb. 1, 1935, when the gates of the diversion tunnels were closed. It is now more than 82 miles long and contains about 4,000,000 acre-feet of water. At full capacity Lake Mead will reach 115 miles up the Colorado River and will be a maximum of 40 miles wide. It will then have a surface area of about 229 square miles and will contain 30,500,000 acre-feet.

Lake Mead will be under the joint supervision of the Bureau of Reclamation and the National Park Service. The Reclamation Bureau will regulate the use of the water in conformity with the purposes for which the dam was built and the Park Service will have charge of the recreational facilities on the lake.

Highway Tax Diversion By New York State Attacked

In a public hearing before the Ways and Means Committee of the New York State Assembly, held on Feb. 4, in connection with the proposed $308,000,000 executive budget for the next fiscal year, Willard T. Chevalier, president of the American Road Builders' Association and spokesman for various other groups interested in highway transport, attacked the arbitrary policy whereby New York, since 1932, has been drastically curtailing highway improvement work and diverting funds collected for that purpose to miscellaneous use.

Col. Chevalier pointed out that, since the great diversion policy of 1932 was inaugurated, gasoline tax revenues and motor vehicle fees have been constantly increasing in totals but have been seized as an expedient in an attempt to balance the budget. He declared that it was manifestly unfair for the state to collect $101,000,000 a year from one group alone and to use such funds for miscellaneous purposes.

Mr. Chevalier also deplored the policy of curtailing highway work at a time when the federal government was attempting to stimulate such activity as a remedy for unemployment, and declared that federal appropriations for highway improvements were intended to promote additional employment, and not to be used as a partial substitute for employment-giving activity which the state had conducted with its own funds prior to 1932.

According to expert studies New York's more heavily traveled roads wear out or become obsolete at the rate of about 600 miles a year, thus rendering annual reconstruction and replacement alone a matter involving $40,000,000. The total appropriations for all highway purpose made by the state and by the federal government in recent years has been below that figure. Registration fees and gasoline tax amount to $101,000,000 a year, a figure sought to be continued in the budget now under consideration. Col. Chevalier recommended an immediate dropping of the last 1c. a gallon emergency gasoline tax and dropping the original 1c. emergency gasoline tax as soon as possible.

Hawk's Nest Contractor Replies

Rinehart & Dennis Co. declines to appear at silicosis hearings in statement of position to House Labor Committee, but invites members to visit tunnel site to obtain first-hand information

DECLARING that the true facts in regard to the working conditions in driving the Hawk's Nest hydroelectric development tunnel cannot be adequately treated in the hearings being conducted by a House labor subcommittee, officials of the Rinehart & Dennis Co., contractor on the tunnel, have declined an invitation to appear before the subcommittee to defend itself against the silicosis charges growing out of the tunnel driving. In a statement to Representative William P. Connery, Jr., chairman of the House Labor Committee, the contractor states his position and invites the subcommittee now holding hearings to visit the project and become acquainted at first hand with the entire situation. The statement asserts that newspaper reports of the hearings show some of the witnesses, evidently repeating slanderous rumors and hearsay, have made sweeping misstatements which are on their face preposterous and absurd, while others have made statements which are known to be false.

Contractor's statement

Following is a condensed statement of the contractor's position as presented to Representative Connery by P. H. Faulconer, president:

"Having built 51 tunnels within the past 30 years, we were one of 35 contractors who, in September, 1929, bid for the construction of the Hawk's Nest development. On March 13, 1930, we were awarded the contract for this work which comprised a dam, a tunnel slightly over 3 miles long, a power house and other related features. Tunneling began June 13, 1930, and twice during progress of the work the time of completion was extended at the owner's request. The downstream section was holed through Aug. 7, 1931; the upstream section on Sept. 19, 1931, and the major trimming was finished by Dec. 1, 1931. However, it was not until December, 1934, that the entire work was virtually completed.

"The number of men employed at various times on the whole development was 4,931. A total of 2,500 worked in the tunnel, of which 500 were white and 2,000 colored. The largest number on the payroll at any one time as tunnel workers was 600, of whom about one-fourth were white men.

"The laborers were partly local residents and partly those who came from elsewhere seeking work. Some of the latter secured places in which to live in nearby settlements. Camp houses were built for the remainder. At all times more men were seeking employment than we were able to employ, and no labor was ever imported. Camp sanitation was carefully supervised, and arrangements were made with a first class hospital for the care of sick and injured employees. Two doctors were employed, one of whom was resident in the camps.

"The principal equipment purchased was four electric shovels, storage battery locomotives for use at the heading, gasoline locomotives for hauling out trains of spoil, and Ingersoll-Rand air compressors and drills. The drills were all fitted with standard water heads for wet drilling, and water pipes and hose were bought and used to carry water to the drills. Wet drilling was insisted upon at all times. The water supply, in ample quantities and under pressure, was available from elevated tanks which were kept full by constant pumping.

Ventilation provided

"Ventilation was taken care of by electric fans and 24-in. tubing which delivered 7,000 cu.ft. of air per minute to each heading. Ventilation experts recommended 20 in. tubing, but we decided to use 24-in. size, which provided 50 per cent more air at the heading.

"Tunneling was by two shifts daily, except Sunday, of 10 hours each. The pay was for full 10 hours, even if the shift was shorter, which was usually the case. There was an interval of at least two hours between cessation of work by one shift and the beginning by the next shift. During this time both the ventilating tubes and compressed air lines were continuously delivering fresh air into the tunnel. Over 8,000 cu.ft. of air per minute was delivered at each heading during working hours and between shifts, which was equivalent to more than 150 cu.ft. of air per minute per man at work.

"Blasting was done at the completion of each shift, and at least two hours before the beginning of the next shift. Approximately 2,000,000 lb. of special gelatin dynamite was used without a single fatality. On several occasions the air in the tunnel was analyzed by chemists, and no harmful ingredients from blasting were found, and the average carbon monoxide content was found to be less than that on busy streets in New York City.

"The muck pile was moist from water from the drills and from the condensation of moisture at the headings. Muck was loaded by the electric shovels into cars which were handled by storage battery locomotives to be made up into trains on a switch at a convenient distance from the heading from which the trains were moved to the outside by the gasoline locomotives.

"The atmosphere in the tunnel was clear and visibility was so good that long surveying sights were made daily at any time, though occasionally there was some fog from condensation of moisture brought in by the ventilating air.

Accident record favorable

"The accident record on this work compares favorably with that of other undertakings of like size and character. There were seventeen fatal accidents, six of which were on the outside and eleven of which were in the tunnel. Four of these involved white men and thirteen colored.

There are official records of 81 deaths in West Virginia of persons in our employ or who had been employed by us, and we have

heard of five others outside of that state. Mortality tables in general use by insurance companies indicated that out of the 4,931 adult males employed on this job, nearly 300 would be expected to die of natural causes from the beginning of the work up to this time. The recorded vital statistics show that during the years the tunnel was drilled, the death rate among white employees was less than the death rate among the adult white males of natural causes from the beginning of the and that the death rate among our colored employees was approximately the same as the death rate among the adult colored males of said county.

"The methods used in this construction were the standard, or better, than have been used not only by us but by other tunnel builders, both on private and in government projects. We used every safeguard of life and health that was known to us or other contractors in similar work. Conditions were better in this tunnel, and were so considered by many visiting engineers and contractors, than in any other tunnel we had ever seen. We did not furnish nor use dust masks or respirators because no need for them was apparent. The disease silicosis was not known to us, nor to other contractors of our acquaintance, before we were surprised by the bringing of damage suits. We have since learned that there were not available, when the tunnel was under construction, any respirator or mask or other device that would protect against microscopic dust, which alone is dangerous, and which if present was invisible and unsuspected.

"We know of no case of silicosis contracted on this job."

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The Board of Transportation reports that arrangements have been made with the New York Railways Corp. for the removal of street car tracks on Sixth Ave. The substitution of bus service on all of Sixth Ave. is estimated to be completed within the next three months, and track removal will begin on the section from 40th to 47th Sts.

A detailed schedule submitted by the Board of Transportation calls for the delivery by Aug. 31, of the final contracts for all sections of the Sixth Ave. subway, which will extend when completed from 8th St. to 53d St. The schedule for the various sections is as follows: from 33d to 40th St., public hearing, Feb. 21; delivery of contract, May 30. From 27th to 33d St., contract ready, March 2; public hearing, March 17; delivery of contract, May 30. From 47th to 53d St., plans ready April 1; contract ready, April 1; bids received May 29; delivery of contract, June 30. From 18th to 27th St., plans ready May 1; contract ready, May 1; delivery of contract, July 26. From 8th to 18th St., plans ready, June 1; contract ready, June 1; public hearing, June 19; delivery of contract, Aug. 31.

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Contract awards mark beginning of intensive program to complete alternate route within two years

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Last month contract was awarded to Deering & Co., Norwalk, for the grading of 12,700 ft. at the western end of the highway. The first 5½ miles of grading on the western end was completed in 1935. Another contract was awarded to Paul Bacco, Stamford, for the construction of a bridge over state highway No. 104 at Stamford and for a bridge over the Rippowam River. Work on the project was first started in 1934 and 8¼ miles of grading and four major bridges have been completed (*ENR*, March 14, 1935, p. 386.)

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With a rather extensive program for highway construction outlined for 1936, the state highway department of Ohio is confronted with a shortage of bidders when projects are offered. Many contractors of the state have withdrawn from bidding on state highway projects because of the alleged excessive number of man-hours required in the specifications for most of these projects. The contractors allege that this leaves little or no opportunity for any profit to the successful bidder. As a large part of the highway construction in the state is being done with the aid of federal funds, it is believed by the contractors that nothing can be done by the state highway department to relieve the situation unless some concession is made by the government in the reduction of the required man-hours.

As an indication of the reluctance of bidders to submit figures on highway construction contracts, on Jan. 28, 1936, ten projects were offered for bids. Of these ten projects, six failed to receive the necessary three bids to meet federal requirements and had to be readvertised. On Feb. 4 the highway department offered two more projects for bids, the most important of which, amounting to about $295,355, failed to attract a single bidder, while the other project which was being advertised for the second time brought only one bid.

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Construction of the Boulder Dam transmission line of the Metropolitan Water District Colorado River aqueduct project was begun Feb. 1. The 237-mile, 230,000 volt line, which ultimately will carry 36 per cent of the electrical energy generated at the Boulder Dam plants, will run south from the dam in the form of an inverted "Y" connecting with the five pumping plants on the Colorado River aqueduct. Work on the transmission line phase of the aqueduct project is being done by Fritz Ziebarth, Long Beach, Calif., contractor, under the direction of F. E. Weymouth, general manager, and James M. Gaylord, chief electrical engineer.

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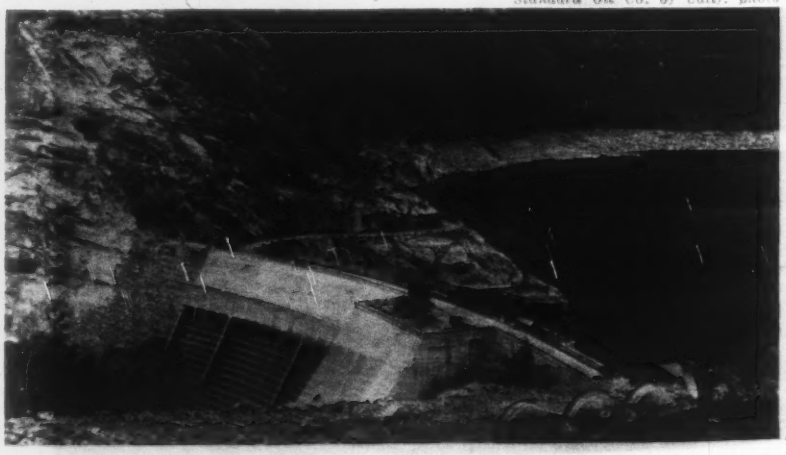
Adding 85 ft. to the height of O'Shaughnessy Dam on San Francisco's Hetch Hetchy water project will bring the total height of the structure to 430 ft. and will increase the capacity of the reservoir from 206,000 to 360,000 acre-ft. A major problem to which careful thought is being given is the bonding of the old concrete to the new on the downstream face of the dam. The thickened central portion of the dam, shown in the foreground of the accompanying view, indicates the amount of concrete that is to be added on the downstream face of the structure. The tunnel at upper left is for the roadway which is to cross the crest of the dam at the raised level. This work is under contract to the Transbay Construction Co., and involves placement of about 275,000 cu.yd. of concrete.

Standard Oil Co. of Calif. photo



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Chicago Dedicates West Side Interceptor Sewer System

Dedication ceremonies on Feb. 5 marked the completion of the 20-mile West Side interceptor sewer system in Chicago, which has been under construction at intervals since 1927 and cost $16,000,000. The system, lying entirely in tunnel, will serve the district bounded by Fullerton Ave. on the north, Lake Michigan on the east, Roosevelt Road and the South Branch of the Chicago River on the south, and Cicero Ave. on the west. The 20 miles of tunnels collect the sewage from this area and deliver it to the West Side treatment works at Stickney. Work is now under way on the Southwest Side interceptor system to serve the area immediately to the south. A full description of the West Side tunnel work was published in a series of three articles appearing in *ENR*, June 13, June 20 and June 27, 1935.

SOCIETY CALENDAR

AMERICAN CONCRETE INSTITUTE, annual meeting, Chicago, Ill., February 25-27.

AMERICAN RAILWAY ENGINEERING ASSOCIATION, annual meeting, Chicago, Ill., March 10-12.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

MINNESOTA SURVEYORS AND ENGINEERS SOCIETY, Minneapolis, February 20-21.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES, Minneapolis, February 21-22.

SOUTHWEST ROAD SHOW AND SCHOOL, Wichita, Kan., February 25-28.

AMERICAN SOCIETY FOR TESTING MATERIALS, regional meeting, Pittsburgh, Pa., March 4, and meetings of committees, March 2-6.

NEW YORK SAFETY CONFERENCE, 7th annual meeting, New York City, March 3-5, 1936.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATER WORKS ASSOCIATION, Lexington, Ky., March 23-25.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, Oswego, N. Y., March 26-27.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Lafayette, Ind., April 7-9.

CANADIAN CONSTRUCTION ASSOCIATION at its annual meeting elected the following officers: president, F. G. RUTLEY; vice-presidents, JOSEPH WILDE, F. J. HALE, A. W. CASSIDY, K. J. CAMPBELL; secretary, L. L. ANTHES; treasurer, E. M. SEALE. J. C. REILLY is general manager.

KENTUCKY SOCIETY OF PROFESSIONAL ENGINEERS at its annual meeting elected the following officers: president, B. M. BRIGMAN; vice-presidents, W. M. CAYE, D. V. TERRELL; secretary-treasurer, C. S. CROUSE.

Jacob Rohrer, Construction Engineer, Dies

Jacob Bomberg Rohrer, retired civil engineer who had participated in the construction of the Chicago drainage canal, died at his home in Brooklyn, N. Y., on Feb. 7. He was 78 years old at the time of his death.

Mr. Rohrer was graduated from the Polytechnic College of Pennsylvania and shortly after became assistant city engineer and then city engineer of Lancaster, Pa. He then entered railroad construction and location work, beginning on the Colebrook Valley R.R. in Pennsylvania. In 1886 he became assistant to the chief engineer of construction of the Piedmont and Cumberland R.R. He later became division engineer for the Tug River division of the Norfolk & Western R.R. From 1892 to 1895 he was on the engineering staff of the Sanitary District of Chicago engaged in the construction of the sanitary drainage canal. For the next five years he was engineer for H. B. Herr & Co., Chicago, then spent some years as engineer, chief engineer and manager, respectively, of the Honolulu Rapid Transit and Land Co. and American-Hawaiian Engineering & Construction Co. After returning to this country he was associated for a number of years with the contracting firm of Charles Meads & Co., New York City. He retired from active business in 1925.

Construction Wage Rate Lowered in Montreal

Rates of pay for building trades workers in the vicinity of Montreal were drastically reduced on Feb. 1 at a meeting of the Building Trades Joint Committee, at which the building trades, contractors and the government were represented. According to the agreement, the new rates are to last for one year. The schedule of wages applies to all municipalities situated on the Island of Montreal and the city of Valleyfield, and are based on a 40-hour week with time and one-half for overtime. The new schedule brings the wages of common laborers from 60 cents to 35 cents per hour; bricklayers from $1 to 70 cents; carpenters from $1 to 60 cents; hoisting engineers from $1.25 to 55 cents; plasterers from $1.25 to 70 cents. The rates for structural ironworkers were not included in the joint committee rates but these also were reduced from $1.25 per hour to 80 cents.

Col. George R. Spalding Named for Promotion

Col. George R. Spalding, recently appointed division engineer of the North Atlantic Division at New York, was designated for promotion to the rank of brigadier general among the nominations sent to the Senate on Jan. 30. The promotion will be for a four-year term as a line officer to succeed Brig.-Gen. Herbert J. Brees, commandant of the Command and General Staff School at Fort Leavenworth, Kansas, who is to be promoted to major general's rank.

Following his service as a member of the special board of public works under the Public Works Administration, Colonel Spalding served as commanding officer at Fort Belvoir, Va., and late in the year was transferred to New York.

War Department Disapproves Gate in Chicago River

Disapproval of the Chicago Sanitary District's application for permission to construct a gate at the mouth of the Chicago River to prevent outflow of polluted river water into Lake Michigan has been announced by the War Department, with the suggestion that a lock with sector gates be installed 1,800 ft. east of the Outer Drive bridge. Sanitary District engineers estimate the lock to cost $3,000,000, while the proposed gate would cost only $1,600,000.

Construction of a barrier at the mouth of the river prior to 1938 is virtually imperative, since at that time diversion of lake water is to be cut from the present 5,000 sec.ft. to 1,500 sec.-ft. As this latter amount must suffice for diversion down the Calumet-Sag and the North Branch channels, the resulting current in the Chicago River will be so low that reversals of flow will be frequent unless a barrier is provided.

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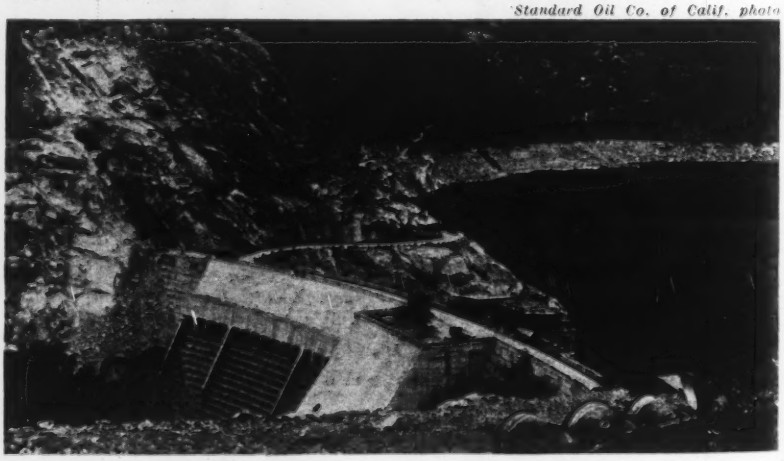

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E. A. Cleveland

Chicago Dedicates West Side Interceptor Sewer System

Dedication ceremonies on Feb. 5 marked the completion of the 20-mile West Side interceptor sewer system in Chicago, which has been under construction at intervals since 1927 and cost $16,000,000. The system, lying entirely in tunnel, will serve the district bounded by Fullerton Ave. on the north, Lake Michigan on the east, Roosevelt Road and the South Branch of the Chicago River on the south, and Cicero Ave. on the west. The 20 miles of tunnels collect the sewage from this area and deliver it to the West Side treatment works at Stickney. Work is now under way on the Southwest Side interceptor system to serve the area immediately to the south. A full description of the West Side tunnel work was published in a series of three articles appearing in *ENR*, June 13, June 20 and June 27, 1935.

SOCIETY CALENDAR

AMERICAN CONCRETE INSTITUTE, annual meeting, Chicago, Ill., February 25-27.

AMERICAN RAILWAY ENGINEERING ASSOCIATION, annual meeting, Chicago, Ill., March 10-12.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

MINNESOTA SURVEYORS AND ENGINEERS SOCIETY, Minneapolis, February 20-21.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES, Minneapolis, February 21-22.

SOUTHWEST ROAD SHOW AND SCHOOL, Wichita, Kan., February 25-28.

AMERICAN SOCIETY FOR TESTING MATERIALS, regional meeting, Pittsburgh, Pa., March 4, and meetings of committees, March 2-6.

NEW YORK SAFETY CONFERENCE, 7th annual meeting, New York City, March 3-5, 1936.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATER WORKS ASSOCIATION, Lexington, Ky., March 23-25.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, Oswego, N. Y., March 26-27.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Lafayette, Ind., April 7-9.

CANADIAN CONSTRUCTION ASSOCIATION at its annual meeting elected the following officers: president, F. G. RUTLEY; vice-presidents, JOSEPH WILDE, F. J. HALE, A. W. CASSIDY, K. I. CAMPBELL; secretary, L. L. ANTHES; treasurer, E. M. SEALE. J. C REILLY is general manager.

KENTUCKY SOCIETY OF PROFESSIONAL ENGINEERS at its annual meeting elected the following officers: president, B. M. BRIGMAN; vice-presidents, W. M. CAYE, D. V. TERRELL; secretary-treasurer, C. S. CROUSE.

Jacob Rohrer, Construction Engineer, Dies

Jacob Bomberg Rohrer, retired civil engineer who had participated in the construction of the Chicago drainage canal, died at his home in Brooklyn, N. Y., on Feb. 7. He was 78 years old at the time of his death.

Mr. Rohrer was graduated from the Polytechnic College of Pennsylvania and shortly after became assistant city engineer and then city engineer of Lancaster, Pa. He then entered railroad construction and location work, beginning on the Colebrook Valley R.R. in Pennsylvania. In 1886 he became assistant to the chief engineer of construction of the Piedmont and Cumberland R.R. He later became division engineer for the Tug River division of the Norfolk & Western R.R. From 1892 to 1895 he was on the engineering staff of the Sanitary District of Chicago engaged in the construction of the sanitary drainage canal. For the next five years he was engineer for H. B. Herr & Co., Chicago, then spent some years as engineer, chief engineer and manager, respectively, of the Honolulu Rapid Transit and Land Co., and American-Hawaiian Engineering & Construction Co. After returning to this country he was associated for a number of years with the contracting firm of Charles Meads & Co., New York City. He retired from active business in 1925.

Construction Wage Rate Lowered in Montreal

Rates of pay for building trades workers in the vicinity of Montreal were drastically reduced on Feb. 1 at a meeting of the Building Trades Joint Committee, at which the building trades, contractors and the government were represented. According to the agreement, the new rates are to last for one year. The schedule of wages applies to all municipalities situated on the Island of Montreal and the city of Valleyfield, and are based on a 40-hour week with time and one-half for overtime. The new schedule brings the wages of common laborers from 60 cents to 35 cents per hour; bricklayers from $1 to 70 cents; carpenters from $1 to 60 cents; hoisting engineers from $1.25 to 55 cents; plasterers from $1.25 to 70 cents. The rates for structural ironworkers were not included in the joint committee rates but these also were reduced from $1.25 per hour to 80 cents.

Col. George R. Spalding Named for Promotion

Col. George R. Spalding, recently appointed division engineer of the North Atlantic Division at New York, was designated for promotion to the rank of brigadier general among the nominations sent to the Senate on Jan. 30. The promotion will be for a four-year term as a line officer to succeed Brig.-Gen. Herbert J. Brees, commandant of the Command and General Staff School at Fort Leavenworth, Kansas, who is to be promoted to major general's rank.

Following his service as a member of the special board of public works under the Public Works Administration, Colonel Spalding served as commanding officer at Fort Belvoir, Va., and late in the year was transferred to New York.

War Department Disapproves Gate in Chicago River

Disapproval of the Chicago Sanitary District's application for permission to construct a gate at the mouth of the Chicago River to prevent outflow of polluted river water into Lake Michigan has been announced by the War Department, with the suggestion that a lock with sector gates be installed 1,800 ft. east of the Outer Drive bridge. Sanitary District engineers estimate the lock to cost $3,000,000, while the proposed gate would cost only $1,600,000.

Construction of a barrier at the mouth of the river prior to 1938 is virtually imperative, since at that time diversion of lake water is to be cut from the present 5,000 sec.ft. to 1,500 sec.-ft. As this latter amount must suffice for diversion down the Calumet-Sag and the North Branch channels, the resulting current in the Chicago River will be so low that reversals of flow will be frequent unless a barrier is provided.

Obituary

WILLIAM T. DONNELLY, civil engineer specializing in marine construction and dry dock work in the Philippines, and consultant of the city of Taunton, Mass., on the Taunton River improvement project, died at Pelham Manor, N. Y., on Feb. 4.

SIR BRADFORD LESLIE, British consulting engineer, died in Auckland, New Zealand, on Feb. 5, at the age of 70.

HENRY M. JONES, 77, for many years engaged in the construction industry in Central America and the Philippines, died at his home in Hemet, Calif., on Feb. 7. Mr. Jones was engaged in construction of the Panama Canal when it was being undertaken by the French and later he supervised construction of the capitol buildings at Guatemala. He later engaged in construction work in the Philippine Islands.

PETER E. POZZO, head of the Pozzo & Sons Construction Co., Los Angeles, Calif., died at his home there on Feb. 7. Mr. Pozzo had been engaged in the construction business in New York before going to California some years ago.

FRANK A. MUTH, superintendent of the Seventeenth Lighthouse District, died in Portland, Ore., on Jan. 31. Mr. Muth, who had been in the federal lighthouse service for 24 years as engineer, assistant superintendent and superintendent, respectively, was a past president of the New Orleans section of the American Society of Civil Engineers.

EDWARD J. THOMAS, for 43 years an engineer with the Mississippi River Commission, died in St. Louis, Mo., on Feb. 3, at the age of 76. During 1917 and 1918 Mr. Thomas served as secretary of the Commission and later as principal engineer in the office of the president. He retired in 1932. After being graduated from the University of Missouri in 1879, he spent the next ten years making railroad and land surveys in the West. In 1908 he was named as a member of the commission to study tidal conditions around Panama as a preliminary to building the canal.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards total $31,445,000 for a four-day week due to Lincoln's Birthday. This volume is made up of private, $6,082,000 and public, $25,363,000 of which $564,000 is federal and $24,799,000, state and municipal. Corresponding values a year ago are: total, $17,194,000; private, $8,311,000; public, $8,883,000; federal, $2,952,000 and state and municipal, $5,931,000.

Highway awards are slightly higher than last week's five-day volume. They total $5,848,000 for the short week. Other classes of work are lower than last week at the following values: commercial buildings, $1,343,000; industrial buildings, $2,619,000; public buildings, $10,646,000; bridges, $1,737,000; waterworks, $2,967,000; sewerage, $1,903,000; earthwork, waterways, etc., $160,000.

The larger projects for the week include: power plant addition, Hammermill Paper Co., Erie, Pa., $500,000; factory, Sherwin-Williams Co., Chicago, Ill., $500,000; chemistry building, University of Washington, Seattle, Wash., $933,000; city hall, Kansas City, Mo., $1,498,000; public school 239, Brooklyn, N. Y., $1,078,000; public school 234, Brooklyn, N. Y., $549,000; Curtis High School, West New Brighton, N. Y., $637,000; superstructure, buildings C & D, Bellevue Hospital, New York, N. Y., $2,145,000; highways, by Alabama, $475,000; by Arizona, $460,000; by Indiana, $438,000; by Kansas, $617,000; paving roads WPA labor, Bridgeport, Conn., $474,000; lighting system, Contract 57, Tri-Borough Bridge, New York, N. Y., $562,000; filter plant and equipment, Constr. 2M, Fort Knox, Ky., $489,000; chemical building and coagulation basins for water purification plant, Cincinnati, O., $943,000; West Altadena storm drain, Los Angeles, Calif., $800,000; 35,000 tons rails, Chicago and N. W. Ry., Chicago, Ill., estimate $1,500,000.

New capital for the week includes state and municipal bond sales aggregating $7,871,000 and corporate issues, $3,500,000.

CONTRACTS

(Thousands of Dollars)

	Weekly Average Feb. 1935	Prev. 4 Weeks	Week Feb. 13* 1936
Federal Government	$2,241	$4,165	564
State and municipal	9,660	33,502	24,799
Total public	$11,901	$37,667	$25,363
Total private	5,121	12,161	6,083
Week's total	$17,022	$49,828	$31,445
Cumulative to date: 1935...$182,695,000		1936...$370,028,000	

*4-day week.

NEW PRODUCTIVE CAPITAL

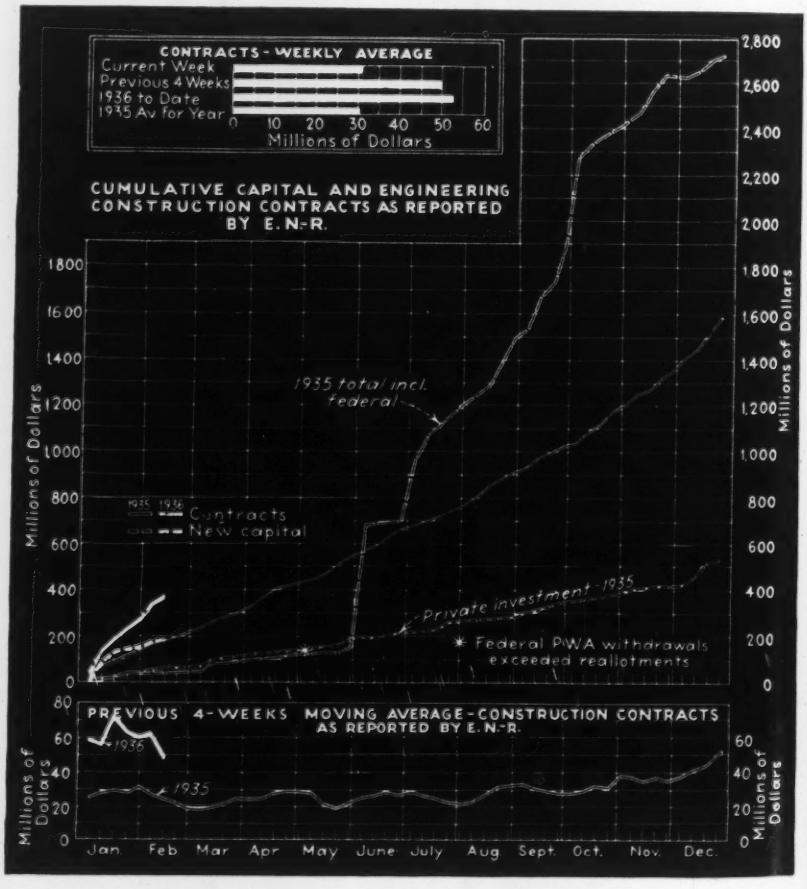
(Thousands of Dollars)

1936	Week Feb. 13	Cumulative
State and municipal	$7,871	$64,782
PWA non-federal	....	66,253
RFC loans	....	25,000
Corporate issues	3,500	29,241
PWA loans	....	1,110
Total Non-Federal	$11,371	$186,386
Federal	115	3,920
Total new capital	$11,486	$190,306
Cumulative to date: 1935...$30,695,000		1936...$190,306,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Feb., 1936	201.20	96.71	Jan., 1936	248	109
Jan., 1936	199.48	95.89	Dec. 1935	254	111
Feb. 1935	196.02	94.22	Jan 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47



Construction Equipment and Materials

Paving Plates Designed For Concrete Surfaces

A protective surfacing for concrete floors and paving is being marketed by Bethlehem Steel Co., Bethlehem, Pa. The plates are designed for installation on the surface of concrete slabs to which they are anchored.

These paving plates are of ¼-in. rolled steel, and are available in two sizes. One is intended for use on roadways; the other for plant floors, loading platforms, and docks. Both types are identical, except that the one for roadways is equipped with button-head studs, making it a non-skid plate. The sides are perpendicular to the surface, and are so crimped as to give the plates firm anchorage in the concrete. Additional anchorage is provided by studs which extend into the concrete. The floor-type paving plate has a smooth surface, the long-shank anchorage studs, with flat heads, fastening through countersunk holes, making them flush with the surface.

Self-Propelled Shovel For Tunneling

A new mechanical shovel, known as the Eimco-Finlay Model 20 loader, for use in tunnels, has been introduced by the Eimco Corp., Salt Lake City, Utah. Compactness, large capacity, and flexibility of operation are outstanding features of the design. The machine operates on track gages from 24 to 42 in. and can be furnished to load cars having a maximum height above rails of 66 in. and standard car length. Self-tramming, it provides a fast, flexible unit for miners and contractors.

The loader is fitted with alloy steel castings, roller bearings, tool steel gears and air motors designed especially for the work by Ingersoll-Rand. The central control situated on the side of the machine is so arranged that each motor is easily available to the operator through a quick-acting throttle. Air consumption ranges from 60 to 140 cu.ft. per minute at pressures from 70 to 100 lb. Simplicity of design and operation make it possible for unskilled labor to learn to operate the machine.

New Screen for Metal Casements

Attaching screens to metal casement windows has been made easier by the Marvel Casement Screen Co., Brooklyn, which has recently introduced a new screen, complete with a light frame of its own, which attaches directly to the casement frame by means of a patented clip. Screen and frame are made of rolled steel, and can be obtained in a variety of finishes.

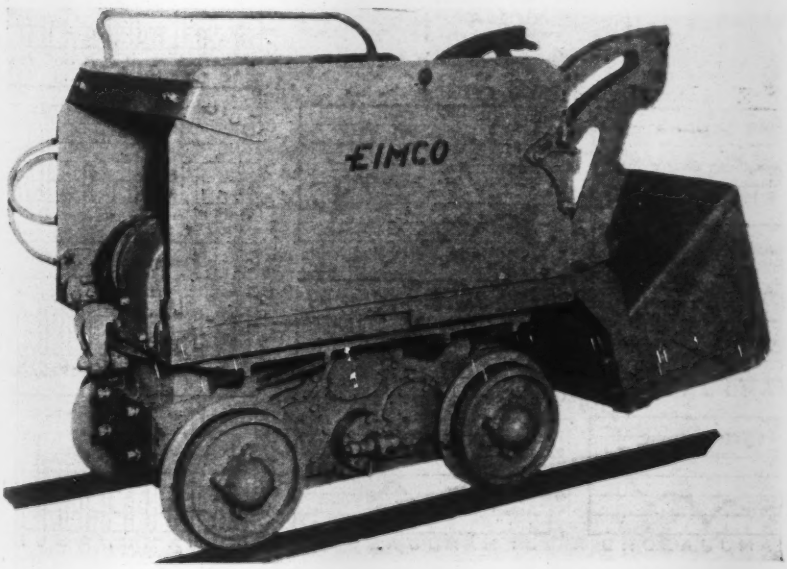
The screen is hung on pin hinges to its own frame, which remains attached to the casement, and need not be removed to detach the screen. Provision is also made for easily replacing of the bronze screening in case of damage or corrosion. The screen can be put on in a few minutes by any handy-man without the use of tools. The screens for a casement window of normal dimensions come in four units, each with its own frame and hinged screen panel, permitting easy access to the control handle without opening more than a small part of the screened area.

Traction Treads for Pneumatic Tires

Metal treads to give single pneumatic tires added traction in mud, sand, ice and snow are being made by the W. A. Riddell Co., Bucyrus, Ohio. These traction treads are similar to the J. & S. Traction Treads for dual wheels which have been manufactured for some time. The treads are simple in construction and designed for maximum flexibility and easy mounting.

Wearing shoes are of alloy steel castings and the links and pins are of heat treated steel. The pins are easily removed and an

adjustable master link allows adjustment to compensate for tire wear. The inside of the tread plate is smooth and curved to fit the tire with sufficient tension to prevent chafing or slipping.



New Publications

FWD TRUCKS IN HIGHWAY SERVICE, Four Wheel Drive Auto Co., Clintonville, Wis. 8½x11, 14 pages.

GALION ROAD PLANER AND VARIABLE WEIGHT TANDEM ROLLER, Galion Iron Works & Mfg. Co., Galion, Ohio. 8½x11, 4 pages. Bulletins 190 and 195, respectively.

CEDARGRAIN ASBESTOS SHINGLES, Johns-Manville, New York City. 8½x11, 6 pages.

REINFORCED CONCRETE PIPE, American Concrete & Steel Pipe Co., Los Angeles, Calif. 8½x11, 72 pages.

NEW TYPE DETACHABLE DRILL BIT, Crucible Steel Co. of America, New York City. 8½x11, 6 pages.

COTTON NUMBER, TEXACO STAR, The Texas Co. New York City. 8½x11, 24 pages, cotton cloth cover.

STEEL STORAGE TANKS, Chicago Bridge & Iron Works, Chicago, Ill. 8½x11, 24 pages. Technical Bulletin No. 11.

JAEGER PAVING EQUIPMENT, Jaeger Machine Co., Columbus, Ohio. 8½x11, 56 pages.

MICROMAX SMOKE-DENSITY RECORDERS, Leeds & Northrup Co., Philadelphia, Pa. 7½x10½, 15 pages.

WORTHINGTON DIESEL ENGINES, Worthington Pump & Machinery Corp., Harrison, N. J. 8½x11, 8 pages.

Business Notes

JAMES W. ARMOUR, formerly vice-president and chief engineer of the Riley Stoker Corp., Worcester, Mass., has been made manager of the Detroit office; OLLISON CRAIG, consulting engineer of the company, has been appointed manager of the engineering department, with offices at Worcester, and Arthur T. Hunter has been made sales manager of the corporation.

JOSEPH T. RYERSON & SON, INC., Chicago, Inc., Chicago, Ill., announces that William J. Fitzgerald has joined the Ryerson organization. He will be located at Minneapolis and will cover Minnesota, North Dakota, South Dakota and Montana.

BARTLETT HAYWARD CO., Baltimore, Md., announces the following changes: Chester F. Hockley, who has been president since 1931, has retired to become president of the Davison Chemical Corp. Walter F. Perkins, formerly vice-president and general manager, has been elected president; G. E. Probest, Jr., formerly secretary and treasurer, has been elected vice-president and treasurer; Herman H. Vordemberge has been elected secretary and assistant treasurer.

BUSINESS SIDE OF CONSTRUCTION

High Awards Continue in January Both Public and Private Work Higher

ENGINEERING construction awards for January total $288,547,000 for a 5-weeks month or an average of $57,709,400 per week. This rate is almost double the rate for new construction a year ago. The total is made up of private, $43,086,000, public, $245,461,000, of which federal is $52,186,000, and state and municipal, $193,275,000. Corresponding values for January, 1935, are: total, $148,264,000; private $23,479,000; public, $124,785,000, of which federal was $48,736,000, and state and municipal, $76,049,000. Gains over last year are: on total, 95%; private, 84%; public, 97%; federal, 7%; state and municipal, 125%.

The largest gains are in public building awards which, for two consecutive months, have reached the highest totals in more than three years. Commercial building awards are the highest they have been in January for three years. Industrial buildings are slightly higher than last January. Streets and roads awards are well ahead of last year but about equal to the January rate two years ago.

Geographically New England awards for January about equal last year, and are slightly below the December volume. In all other territories the January volume is substantially ahead of last year but slightly under the December record except in the Far West where January topped December.

New Capital

New construction financing through private investment is running well ahead of a year ago. State and municipal bond sales for construction total $49,738,000 for January compared with $34,219,000 a year ago and corporate security issues for plant improvements or new plant construction total $16,985,000 where none are recorded for last January. Total new capital including federal loans and grants made from PWA's revolving fund is $162,106,000 for January compared with $31,250,000 a year ago when federal PWA recisions exceeded reallotments.

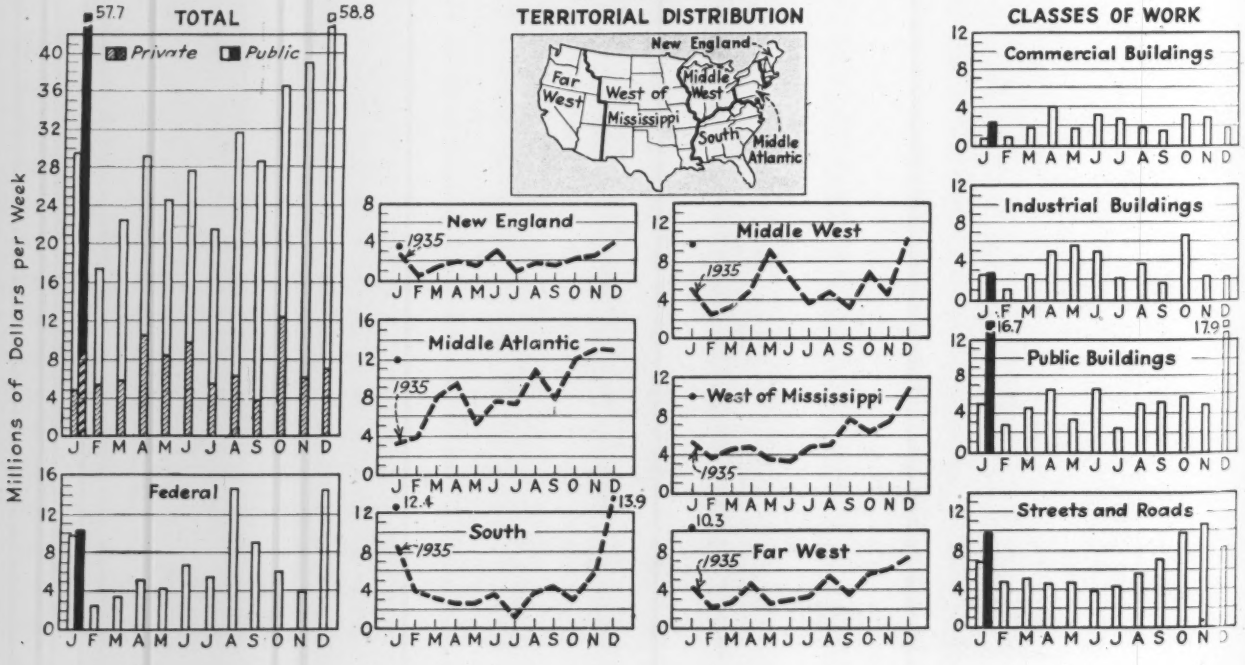
Materials

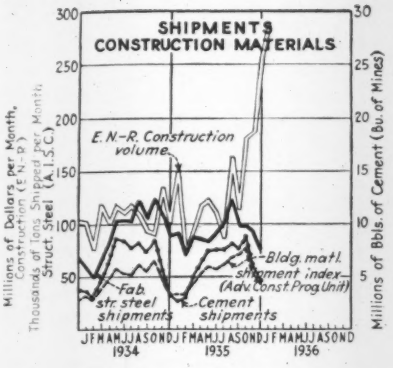
Cement—Cement shipments in December totaled 4,514,000 bbl., an increase of 45.4 per cent compared with December, 1934. Stocks at mills were 6.8 per cent higher than a year ago. Production in December increased 23.4 per cent as reported by the U. S. Bureau of Mines. The ratio of production to capacity was 25.6 for December compared with 19.5 a year ago and 32.2 in November.

ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN JANUARY, 1936
Five Weeks—Thousands of Dollars (000 Omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States Jan., 1936	United States Jan., 1935	Canada
Public Works									
Waterworks	917	1,155	1,087	2,873	2,551	9,358	**17,941**	9,666	511
Sewerage	1,513	7,069	295	10,624	2,459	1,431	**23,391**	5,482	264
Bridges, public	1,323	2,804	446	3,425	5,847	5,988	**19,833**	7,792	308
Earthwork and waterways	54	775	34,291	2	4,100	5,263	**44,485**	39,392	21
Streets and roads	633	8,580	9,842	9,949	13,343	7,196	**49,543**	34,395	* 45
Buildings, public	11,597	16,023	13,323	17,007	12,911	9,171	**80,032**	25,612	2,686
Unclassified, public	193	7,542	463	522	348	1,168	**10,236**	2,446	53
Total public	16,230	43,948	59,747	44,402	41,559	39,575	**245,461**	124,785	3,888
Federal gov't (included in above classifications)	434	3,158	39,422	434	2,149	6,589	**52,186**	48,736	
Private									
Bridges, private	.....	454	.....	336	168	.....	**958**	176	
Buildings, industrial	518	3,109	1,507	2,254	1,910	3,733	**13,031**	11,414	8,215
Buildings, commercial	.....	8,999	700	665	205	1,100	**11,669**	3,760	
Unclassified, private	.....	3,306	200	677	6,240	7,005	**17,428**	8,129	
Total private	518	15,868	2,407	3,932	8,523	11,838	**43,086**	23,479	8,215
January, 1936 (5 weeks)	**16,748**	**59,816**	**62,154**	**48,334**	**50,082**	**51,413**	**288,547**	.....	**12,103**
December, 1935 (4 weeks)	15,386	51,124	55,416	40,425	43,573	29,582	**235,506**	.....	422
January, 1935 (5 weeks)	12,306	17,801	42,636	26,366	27,595	21,560	.....	148,264	4,031

ENGINEERING CONSTRUCTION REPORTED BY E.N.-R. WEEKLY AVERAGES
□--1935 ■—1936




SHIPMENTS CONSTRUCTION MATERIALS
E.N.-R. Construction volume
Bldg. matl. shipment index (Adv Const Prog Unit)
Fab. str. steel shipments
Cement shipments
Millions of Dollars per Month, Construction (E.N.-R.) Thousands of Tons Shipped per Month, Struct. Steel (A.I.S.C.)
Millions of Bbls. of Cement (Bu. of Mines)
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1934 1935 1936

Steel—The operating rate of steel companies having 98.0 per cent of the steel capacity reporting to American Iron and Steel Institute ranged from 49.2 to 49.9 in January compared with the range from 43.4 to 52.5 a year ago. The average for the month was 49.5.

During the last quarter of the year bookings and shipments of fabricated structural steel were maintained at sufficient volume that bookings and shipments for the year are reported to be about the same volume as in 1934 according to reports to the American Institute of Steel Construction. The industry in December was operating at 38.7 per cent of normal capacity. During the last 6 months of 1935 the monthly operating capacity averaged 40.8 per cent.

Lumber—New business booked at lumber mills during the week ended January 18 was heavier than for any previous week since April while shipments from the mills were heavier than in any of the preceding six weeks according to reports to the National Lumber Manufacturers Association. Shipments totaled 178,481,000 ft., booked orders 231,091,000 ft.

The index of shipments of construction materials compiled by Advance Construction Programs Unit, Space Control for December is 43 compared with 33 a year ago, and 53 in November.

Building permits totaled $62,992,039 for December as reported for 215 cities by Dun & Bradstreet, Inc. With the exception of the October, 1935, total of $66,965,705, December's figure was the highest since October, 1931, and was almost treble the value of permits in December, 1934. New York City gained sharply in December, permits amounting to $14,210,215, an increase of 10.3 per cent above November and of 289.7 per cent above the corresponding month a year ago. The year's total was up 71.3 per cent.

Labor

Employment in the production of six major construction materials is reported at 46.0 for December compared with 39.8 a year ago and with 47.5 in November by Advance Construction Programs Unit, Space Control.

Employment reports for December from the Bureau of Labor Statistics, U. S. Dept. of Labor state that "seasonal recessions in employment and payrolls from November to December in the private building construction industry show a decrease of 6.7 per cent in employment which is less pronounced than the declines reported in December of any of the 4 preceding years for which data are available. Previous December losses in employment have ranged from 10.7 per cent (December, 1931) to 17.7 per cent (December, 1933). The decrease in weekly payrolls (4.3 per cent) was less pronounced than the employment decline, indicating higher average earnings in December than in the preceding month. The data are based on reports received from 9,699 contractors employing 80,278 workers during the pay period ending nearest December 15. The figures relate to employees engaged in the erection, altering, and repairing of private buildings and do not include projects financed by Public Works Administration or Reconstruction Finance Corporation funds, regular appropriations of the Federal, State and local governments, or loans insured by the Federal Housing Administration.

Emergency work

The number of jobs provided by the construction program financed by the Emergency Relief Act of 1935 showed an increase of more than 1,300,000 during December. The total employed on this program during the month ending December 15 amounted to more than 2,550,000. Payroll disbursements for the month totaled more than $101,000,000. More than $25,000,000 worth of material was purchased during the month for use on these construction projects.

Employment on the Public Works Administration program decreased by 45,000 during the month. This leaves the total of 235,000 people employed on this program as of December 15. Payrolls for these workers exceeded $17,000,000. Purchase orders were placed for construction materials valued at over $25,000,000 during the month.

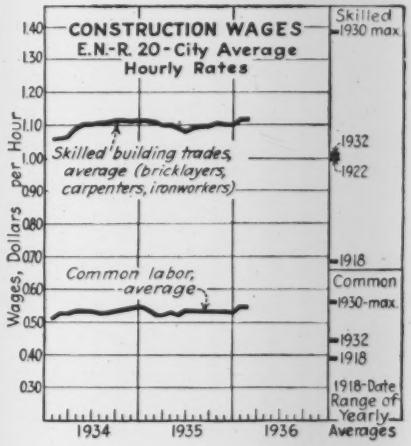
There were 513,000 men employed on emergency conservation work (C.C.C. Camps) during December. Of this total, 455,000 were enrolled workers. In addition to the enrolled men, there were 9,700 reserve officers, 2,200 camp educational advisers, and 46,500 technical and supervisory workers. Payrolls for this work totaled nearly $22,000,000.

Due to the seasonal curtailment of road work, there was a decrease of nearly 5,000 in the number of workers employed at the site of construction projects financed from appropriations made by Congress direct to the federal departments. All other types of construction so financed showed slight gains during the month. More than 57,000 workers were employed on these construction projects. They earned approximately $4,000,000 for their month's work.

The construction and maintenance of State roads provided work for 150,000 men during this month. This compares with November total of 171,000. Payrolls for December totaled $0,200,000.

Labor rates in the United States stiffened in January but show few changes in February. Carpenters in San Francisco established $9 for 8 hours, 5-day week effective Feb. 1. This is full restoration of the pre-depression scale.

In Canada, a reduction is reported in the agreement for the coming year, effective Feb. 1. Bricklayers rates go down from $1 to 70c., carpenters from $1 to 60c., structural ironworkers from $1.25 to 80c., hoisting engineers from $1.25 to 55c., plasterers from $1.25 to 70c., and common labor from 60c. to 35c.



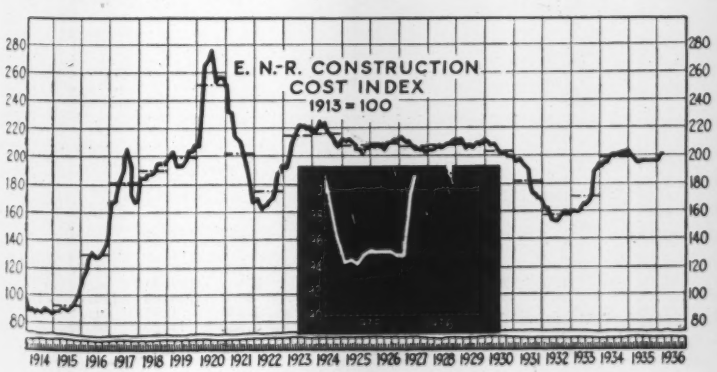
ENR Cost and Volume Index

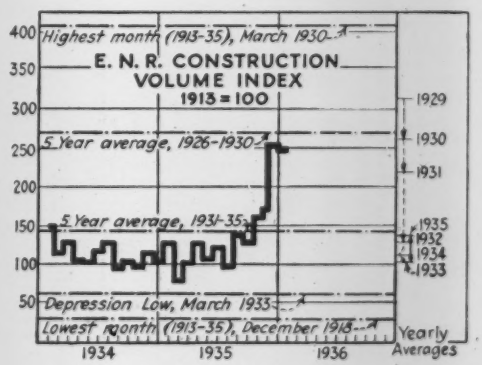
THE *Engineering News-Record* Construction Cost Index is 201.20 for February, a rise of 1.72 points due principally to an increase in lumber price.

The *ENR* Volume Index is 248 for January.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Feb., 1936	**201.20**	**96.71**	**Jan., 1936**	**248**	**109**
Jan., 1936	199.48	95.89	Dec., 1935	254	111
Feb., 1935	196.02	94.22	Jan., 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47





Current Construction Unit Prices

Irrigation Canals, Texas

CONSTRUCTION of Maverick County, Texas, irrigation canals involving approximately 3,000 ft. of main canal, together with laterals, appurtenant works and 20,000 ft. of pipe line, started in January, 1936, with the award of contract to Hardwick Construction Co. Alternative bids were secured on air placed, 3-in. and 2½-in. concrete for the 200,000 sq.ft. of canal lining required, the contract being awarded on the air method although on all other bids the 2½-in. poured lining was the lowest. The construction, financed through PWA funds, is under the jurisdiction of Myers, Noyes & Forrest, Consulting Engineers, Dallas, Texas.

The accompanying tabulations list the unit bids and totals for the three low bidders on each division of the work: Main canal—(A) Hardwick Const. Co., St. Louis, Mo., $896,976; (B) W. E. Callahan Const. Co., Dallas, Tex., $1,103,273; (C) Martin Wunderlich Co., Jefferson City, Mo., $1,125,545. Laterals—(D) W. E. Callahan Const. Co., $265,529; (E) Hardwick Const. Co., $286,916; (F) Atlas Const. Co. & Brown & Root, $327,533. Main canal north end reconstruction—(G) Hardwick Const. Co., $290,784; (H) W. E. Callahan Const. Co., $286,916; (J) Martin Wunderlich Const. Co., $320,392. Hardwick Const. Co. was low on the combined bids, $1,474,676.

MAVERICK COUNTY, TEXAS, WATER CONTROL CANALS

Items	Main Canal Quan.	A	B	C	Laterals Quan.	D	E	F	North End Reconstruction Quan.	G	H	J
Earthwork, earth—cu.yd.	4,535,437	.075	.10	.105	622,026	.10	.11	.11	936,788	.075	.128	.11
Earthwork, cemented gravel—cu.yd.	451,721	.10	.32	.24	22,050	.32	.15	.43	3,000*	4.00	4.00	5.00
Earthwork, hard shale—cu.yd.	87,548	.43	.43	.50	20,000	.40	.40	.45				
Earthwork, solid rock—cu.yd.	31,612	1.30	.75	.90	1,250	.75	1.30	1.25	21,213	1.30	.75	.90
Scraper excavation—cu.yd.	25,000	.23	.25	.36	16,400	.25	.20	.25				
Clear & grub—acre	825	20.00	10.00	20.00	500	10.00	20.00	12.00	1.75	20.00	10.00	20.00
Wetted rolled emb.—cu.yd.	40,000	.30	.34	.40	5,330	.34	.40	.50	92,180	.25	.32	.40
Earth canal lining—sq.ft.	600,000	.04	.02	.015	35,989	.02	.06	.03				
Overhaul, machine—sta. cu.yd.	100,000	.02	.05	.03	20,000	.05	.02	.05				
Overhaul, truck, team—sta. cu.yd.	20,000	.02	.03	.03	2,000	.03	.02	.05				
Cl. I excav. hand, dry—cu.yd.	20,000	1.00	1.52	.80	2,100	1.52	1.00	1.30	500	1.00	1.52	1.00
Cl. I excav. hand, wet—cu.yd.	200	2.00	3.16	5.00	140	3.16	2.00	3.00	500	2.00	3.16	6.00
Cl. I excav. machine—cu.yd.	50,000	.20	.41	.40	7,859	.41	.25	.35				
Cl. II excav. machine—cu.yd.	5,000	.25	.61	1.00	3,929	.61	.35	.65	18,400	.25	.41	.40
Cl. II excav. hand, dry—cu.yd.	1,800	1.25	2.52	1.20	565	2.52	1.25	1.75				
Cl. II excav. hand, wet—cu.yd.	200	2.50	3.50	6.00	270	3.50	2.25	3.00				
Cl. III excav. machine—cu.yd.	4,000	.50	.61	1.00	3,929	.61	.50	.75				
Cl. III excav. hand, dry—cu.yd.	1,500	1.50	2.52	1.20	565	2.52	1.50	1.75				
Cl. III excav. hand, wet—cu.yd.	500	2.75	3.50	6.00	270	3.50	2.50	3.00				
Cl. IV excav. machine—cu.yd.	430	4.00	1.42	1.50	21	1.42	4.00	3.00	1,000	2.00	1.42	1.00
Cl. IV excav. hand, dry—cu.yd.	500	6.00	3.79	2.00	7	3.79	2.00	5.00	500	5.00	3.79	1.50
Cl. IV excav. hand, wet—cu.yd.	164	6.00	4.00	6.00	7	4.00	2.00	7.00	500	6.00	4.00	6.00
Concrete, Cl. A, 0 to 10 cu.yd—cu.yd.	50	25.00	22.06	50.00	420	22.06	24.33	33.70				
Concrete, Cl. A, 10 to 50 cu.yd—cu.yd.	1,084	22.00	18.90	25.00	207	18.90	23.00	30.00				
Concrete, Cl. A, 50 to 100 cu.yd.—cu.yd.	1,024	21.00	18.90	20.00	207	18.90	22.00	25.00				
Concrete, Cl. A, 100 to 500 cu.yd.—cu.yd.	2,239	20.00	18.75	19.00								
Concrete, Cl. A, over 500 cu.yd.—cu.yd.	5,870	17.00	18.08	18.00								
Concrete, Cl. B, 0 to 10 cu.yd.—cu.yd.	41	24.50	21.38	40.00	1,540	21.40	24.00	32.00	957	22.00	18.00	24.00
Concrete, Cl. B, 10 to 50 cu.yd.—cu.yd.	502	21.50	18.22	24.00	116	18.22	22.50	28.00				
Concrete, Cl. B, 50 to 100 cu.yd.—cu.yd.	416	20.50	18.22	19.00	69	18.22	21.50	25.00				
Concrete, Cl. B, 100 to 500 cu.yd.—cu.yd.	444	20.50	18.07	19.00								
Concrete, Cl. C, 0 to 10 cu.yd.—cu.yd.	50	25.00	20.71	38.00					74	21.00	17.35	23.00
Concrete, Cl. C, 10 to 50 cu.yd—cu.yd.	85	21.00	17.55	23.00	860	21.00	23.50	29.50				
Concrete, Cl. C, 50 to 100 cu.yd.—cu.yd.	325	20.00	17.55	18.90								
Mortar—cu.yd.	50	15.00	15.00	20.00								
Canal lining, 3 in. concrete—sq.ft.	157,500	.22	.22	.17	40,760	.22	.22	.21				
Canal lining, 2½ in. concrete—sq.ft.	157,500	.20	.21	.16	40,760	.21	.20	.19				
Cradle concrete—cu.yd.	200	15.00	17.50	18.00	50	17.50	20.00	18.00				
Reinforcing bars—lb.	722,049	.04	.044	.07	166,198	.044	.04	.05	101,491	.04	.044	.07
Reinforcing mesh—sq.ft.	16,900	.03	.0586	.04								
Std. reinf. conc. culvert, 18 in.—lin.ft.	185	2.00	1.80	2.50	5,635	1.80	2.00	2.50				
Std. reinf. conc. culvert, 24 in.—lin.ft.	200	3.00	2.80	3.25	3,100	2.80	3.00	3.00				
Std. reinf. conc. culvert, 30 in.—lin.ft.	200	4.00	3.35	4.00	360	3.35	4.00	4.35				
Std. reinf. conc. culvert, 36 in.—lin.ft.	200	5.00	4.25	5.00	1,425	4.25	5.00	5.10				
Extra strength, 18 in.—lin.ft.	100	2.25	2.00	3.00	100	2.00	2.25	2.85				
Extra strength, 24 in.—lin.ft.	100	3.25	2.90	4.00	100	2.90	3.25	3.75				
Extra strength, 36 in.—lin.ft.	100	5.25	4.95	6.00	100	4.95	5.25	6.10				
Air placed canal lining—sq.ft.	157,500	.18	.237	.18	40,760	.237	.18	.21				
Riprap—cu.yd.	500	4.00	1.75	4.00	200	2.00	8.00	5.50	6,025	3.00	1.72	4.00
Gravel riprap blanket—cu.yd.	250	1.50	.95	3.00	200	1.00	1.50	3.00	715	1.50	1.50	3.00
Grout paving—cu.yd.	580	8.00	7.77	6.00	100	7.77	8.00	13.00	308	8.00	7.77	6.00
Untreated lumber—M.B.M.	55	100.00	88.37	90.00	180	90.00	100.00	90.00	179.5	100.00	90.00	90.00
Creosoted lumber—M.B.M.	47	125.00	129.40	120.00	40	130.00	125.00	130.00	39.7	125.00	130.00	120.00
Treated piling—lin.ft.	6,440	1.00	1.15	1.20					2,280	1.00	1.15	1.20
Rubble masonry—cu.yd.	200	12.00	10.30	8.00	100	10.30	12.00	12.00	3,022	10.00	10.30	5.00
Earth canal lining, extra haul—cu.yd.	1,000	.06	.12	.07	400	.12	.06	.10				

*Underwater excavation.

Concrete Arch Bridge, Colorado

CONSTRUCTION of a reinforced concrete arch bridge over Pipe Creek, near Colorado Springs, Colo., on State Highway No. 1, is scheduled for completion July 1, 1936, under contract awarded in December, 1936. The work involves the removal of an existing detour bridge, 90 tons of reinforcing and structural steel and 1,200 cu.yd. concrete.

The accompanying tabulation lists the unit prices and totals of the two low bidders, together with the averages for all bidders. The totals include 10 per cent administration and engineering charges added by the highway department. (A) Frank M. Kenney, Denver, Colo. (contract), $56,649; (B) Sacra & Watts, Denver, Colo., $57,971; (C) average, $64,534.

Item	A	B	C
1. Remove detour bridge—total	$500.00	$300.00	$375.00
2. Remove struct. pave., walls—total	3,500	2,500	3,650
3. Excavation, common—1,500 cu.yd.	.50	.60	.708
4. Excavation, dry rock—710 cu.yd.	2.00	3.00	2.58
5. Excavation, dry common—990 cu.yd.	1.00	1.00	1.10
6. Excavation, wet rock—490 cu.yd.	3.50	4.00	3.75
7. Excavation, wet common—110 cu.yd.	3.00	3.00	2.75
8. Concrete, Cl. A—1,200 cu.yd.	26.00	27.95	30.57
9. Reinforcing steel—163,780 lb.	.055	.05	.058
10. Struct. steel—16,100 lb.	.065	.065	.0691
11. Culvert, con. metal 10 in.—150 lin.ft.	1.25	1.50	1.291
12. Riprap—180 cu.yd.	3.00	2.00	3.83
13. Conc. slope & ditch pave.—60 sq.yd.	3.50	2.00	2.83
14. Bronze name plate—1 each.	25.00	25.00	30.83
15. Trash guard pave. cr.—4 each.	8.00	10.00	7.83
16. Drain pipe, 3x12 in.—18 each.	2.50	2.50	2.42

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

†Calif., **Mare Island**—Yards & Docks, Navy Dpt., Wash., D. C., withdrew bids to have been opened Feb. 5, water treatment, etc., at Naval Hospital. Work temporarily off market. Noted Feb. 3, C. D.

Calif., **Victorville**—Property Owners in area extending along Mojave River have voted to form a County Water District, it is proposed to develop water to serve 60,000 acres centering around Helendale. H. L. Way, Court House, San Bernardino, co. surv.

†D. C., **Wash.**—U. S. Eng., Navy Bldg., rejected bids Jan. 8, testing, pumping and electrical equipment for McMillan Station. Will readvertise. Noted Jan. 14, C. D.—Dec. 5, E. N.-R.

★Ill., **Cicero**—Town rejected bids Jan. 31, arterial main, pumping station, 1 m.g. elevated tank, $1,080,000. C. DeLeuw Co., 20 North Wacker Dr., Chicago, engrs. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Pa., **Oil City**—City plans improvements to water supply and distribution system, incl. laying two 12 in. lines across the Allegheny River and erection of manhole on right bank of river opposite city. **Maturity late in spring.** B. B. Webber, city engr.

BIDS ASKED

La., **New Orleans**—Apr. 2, by Sewerage & Water Bd., installing 30 in. watermain in Magnolia and other streets, Contr. 204-W, $177,000; installing watermains in Algiers, Gentilly Rd. and other parts of city, Contr. 202-W, $83,000. Sewerage & Water Bd., New Orleans, engrs.

Mich., **Muskegon**—Feb. 17 (extended date), by R. F. Cooper, city clk., waterworks additions and improvements, Contr. 2, incl. 16 m.g.p.d.c. filtration plant superstructure; Contr. 3, filtration and other equipment; Contr. 4, 1 m.g. elevated steel tank, tower and foundation. P.W.A. project. Consoer, Townsend & Quinlan, 205 West Wacker Dr., Chicago, Ill., engrs. Noted Jan. 24, C. D.—Jan. 30, E. N-R.

Minn., **Red Wing**—Feb. 18, by State, c/o Comm. of Administration & Finance, 120 State Capitol Bldg., St. Paul, furnishing, installing one 500 gal. deep well pump and one 500 gal. horizontal centrifugal pump with piping, wiring, etc., at State Training School for Boys. G. M. Orr & Co., 408 Baker Bldg., Minneapolis, engrs.

N. J., **Belleville**—See "Contracts Awarded."

N. J., **East Brunswick** — See "Contracts Awarded."

N. Y., **Ithaca**—See "Sewerage and Waste Disposal."

Pa., **Lockhaven**—Mar. 2, by J. A. Holter, secy., Clinton Co., constructing water supply system, incl. earthen dam with masonry core wall and masonry spillway, pipe line and distributing system of sand spun c.i. pipe and chlorination plant. P.W.A. project. G. M. Busch, Jr., 112 West 4th St., Williamsport, Pa., engr.

Pa., **Morrisville**—Feb. 24, by Common Council, improvements and alterations to waterworks. Est. $41,936. Grant of $19,636 from Federal Government and loan of $22,000. W.P.A. project. H. H. Lee, 333 North Pennsylvania Ave., engr. Noted Oct. 25, C. D. — Oct. 31, E. N.-R.

LOW BIDDERS

★Calif., **San Francisco** — Public Utilities Comn., City Hall, Feb. 5, constructing Crystal Springs Pipe Line, from Youdall Constr. Co., Matson Bldg., Sect. A, $846,159; Sect. B, $469,182***from Macdonald & Kahn, Financial Center Bldg., Sects. A and B combined $1,517,129. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

CONTRACTS AWARDED

Calif., **Alhambra** — City Clerk, constructing two 140 diam. tanks, 21 ft. high, to Chicago Bridge & Iron Wks., 608 South Hill St., Los Angeles, $68,865. Bids Jan. 28, awarded Feb. 7. Noted Jan. 21, C. D.

Calif., **Antioch**—City Council, furnishing 13,550 lin.ft. cement-lined c.i. pipe and miscellaneous fittings to be used in replacement of 14 in. pipe line, addition of electrically-driven centrifugal pump and pumping plant, to U. S. Pipe & Fdry. Co., Monadnock Bldg., San Francisco, $45,988 Est. $95,000. Bids Jan. 27, awarded Feb. 3. Noted Jan. 23, C.D.

Calif., **Arcadia**—City Council, constructing water supply system, involving 11,040 ft. 30x4 in. steel watermains, fittings, valves, etc., to Southwest Welding & Mfg. Co., 3201 West Mission Rd., Alhambra, $82,283. Est. $79,000. Bids Jan. 22. Noted Jan. 30, C. D.

Calif., **Los Angeles**—Western Pipe & Steel Co., general contractors, 5717 Santa Fe Ave., excavation in connection with construction of sections of Cajalco-Fontana Pipe Line, Metropolitan Water Dist., 306 West 3rd St., to Morrison-Knudsen Co., Title Guarantee Bldg., $250,000. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

Calif., **San Diego**—Purchasing Agent at office of City Clerk, portion of El Capitan-Lakeside Pipe Line, F.P. Wks. Project 5575, consisting of 4 mi. 48 in. and 2 mi. 36 in. electrically welded steel pipe with protective coating of coal tar enamel or cement, to Consolidated Steel Corp. Ltd., 6500 East Slauson Ave., Los Angeles, $412,259. Bids Jan. 28. Award subject to **P.W.A.** Noted Jan. 29, C.D.—Jan. 9, E.N.-R.

Calif., **San Francisco**—Public Utilities Comn., City Hall, constructing central pumps reservoir (covered), with concrete roof and lining, valve house and inlet and outlet structures, install steel pipe lines together with slide gates, install valves, c.i. pipe lines, etc., to Macdonald & Kahn, Financial Center Bldg., $157,310. Bids Jan. 21, awarded Jan. 28. Noted Jan. 28, C. D.—Jan. 9, E. N.-R.

Calif., **San Francisco**—Public Utilities Comn., City Hall, laying 6 in. and 8 in. c.i. watermains in area from Esmeralda to Silver Ave., and from Waterville to Mission Sts., to Pacific States Constr. Co., Call Bldg., $24,420; laying 6 and 8 in. c.i. watermains in area from Orizaba Ave. to Rolph St., and from Seneca Ave. to county line, to Lowrie Paving Co., 1540 16th St., $19,490. Bids Jan. 22, awarded Jan. 29. Noted Jan. 24, C. D.

Colo., **Loveland**—City Clerk, waterworks system, to J. S. Schwartz, Colorado Springs, $53,448. Bids Dec. 23. **P.W.A.** Noted Dec. 19, C. D.

Conn., **Niantic**—Quartermaster General, State Armory, Hartford, water system and sanitary sewerage system, incl. sewage disposal field, septic tank, mains and leaching chambers, to C. W. Blakeslee & Sons, Inc., 58 Waverly St., New Haven, $48,076; elevated water tank, to Pittsburgh-Des Moines Steel Co., 270 Broadway, New York, $8,820. Est. $68,000. Bids Jan. 27. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

Ga., **Reidsville**—City, constructing deep well for water supply, to Gray & Stevens, 554 Forest St., Jacksonville, Fla., $1,988. Est. $8,181. **P.W.A.** Bids Dec. 3. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

†Ky., **Fort Knox** — Con. Q.M., Fort Knox, filter equipment for water system, to Roberts Filter Mfg. Co., Darby, Pa.***paved entrance road, to G. M. Eady Co., 340 Byrne St., Louisville, Ky.***16 in. c.i. force main, to Ulen Contg. Corp., 38 South Dearborn St., Chicago, Ill.***steel tank, dam, Otter Creek Pumping Station, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $346,560***4 centrifugal pumps, to Dayton Dowd Co., Quincy, Ill.***2 centrifugal pumps, to Fairbanks Morse & Co., 1940 West 6th St., Cincinnati, O.*** filtration plant building, to C. H. Tompkins Co., 1630 Conn. Ave., Wash., D. C., $141,900. Bids Jan. 13. Noted Jan. 24, C. D.—Dec. 26, E. N.-R.

Minn., **St. Paul**—City, furnishing and installing 12- to 24-in. c.i. mains from Snelling-Larpenteur Aves. to Dale St. across connections in other streets, to Minnesota Contractors, Inc., foot of Reserve St., $114,219. **P.W.A.** Bids Dec. 21.

Neb., **Clarks**—City, constructing gate valve and box for waterworks, Sects. 2 and 3, to Interstate Mchy. & Supply Co., 1006 Douglas St., Omaha, $257. **P.W.A.** Bids Nov. 12. Noted Nov. 22, C. D.—Nov. 7, E. N.-R.

Neb., **Imperial**—City, steady bearings on water turbine, to James Leffel Co., 426 East St., Springfield, O., $350. Henningson Eng. Co., Omaha, engrs.

N. J., **Belleville**—Town, constructing watermain in Sunset Ave., Jannarone and Federal Park Sts., $2,859***Chestnut St. from Passaic Ave., $5,683, relief labor. **W.P.A.** M. Sheen, Town Hall, engr.

N. J., **East Brunswick**—Town, extending watermain along State Hy. 28, from Ickes Ave. to Prospect St., relief labor. $24,098. **W.P.A.** J. H. Weitzan, 313 State St., Perth Amboy, W.P.A. engr.

N. C., **Greensboro**—City, water distribution system extensions, to J. B. McCrary Co., 22 Marietta St. Bl., Atlanta, Ga., $56,774. C. W. Smedberg, dir. P. Wks.

N. D., **Minot**—State Normal School, drilling well at State Normal School, to C. A. Simpson, Bisbee, at $8 per ft. Received no bids Jan. 21, concrete, steel pump house. Noted Jan. 16, C. D.

O., **Basil**—City, constructing water distribution mains, to C. J. Wetzel, 126 Otterbein Ave., Dayton, $25,436.

O., **Cincinnati**—City laying 4.315 ft. 6- to 60-in. c.i. watermains in Martin St., to Crumley, Jones & Crumley, Blue Ash and Hegner Sts., $124,576. Est. $198,300. **P.W.A.** Noted Dec. 11—C.D., Dec. 19, E.N.-R.

★O., **Cincinnati**—City, constructing chemical building and coagulation basins and all work in connection with water purification plant, to Penker Constr. Co., 1030 Summer St., $942,517. Est. $800,000. **P.W.A.** Noted Dec. 18, C. D.—Dec. 26, E. N.-R.

O., **Cincinnati**—City, furnishing four venturi meters, 40 rate of flow gages, 40 loss of head gages, 6 liquid level gages, miscellaneous instruments and panel boards, to Cochrane Corp., 17 Bl. Allegheny Ave., Phila., Pa., $30,423. **P.W.A.** Noted Dec. 12, C. D.

O., **Waterville**—City, constructing water purification plant, Contr. 1, all sections, to C. D. Mitchell, Carey, $31,570. **P.W.A.** Noted Dec. 11, C. D.

Tex., **Deport**—City, c/o J. R. Hutchinson, mayor, constructing complete waterworks, incl. distribution system, elevated tanks, valves and meters, to C. W. Lytle, 504 Nebraska St., Sioux City, Ia., $63,739. Est. $63,000. **P.W.A.** Bids Dec. 4, awarded Jan. 30. Noted Jan. 3, C.D.—Oct. 31, E.N.-R.

Tex., **Fredericksburg**—City, c/o E. Krauskopf, mayor, constructing complete waterworks, incl. Vann, Mercedes, $38,355. Est. $40,000. **P.W.A.** Bids Dec. 13, awarded Jan. 30. Noted Jan. 2, C.D.

Wis., **Stoughton** — Municipality, distributor for iron removal plant, to Northern Conveyor Co., Janesville, $1,518; floating cover, to Graver Tank & Mfg. Co., 332 South Michigan Ave., Chicago, Ill., $3,421. **P.W.A.** Bids Dec. 7. Noted Nov. 8, C. D.—Nov. 14, E. N.-R.

†T. H., **Pearl Harbor**—Yards & Docks, Navy Dpt., Wash., D. C., improving water supply at Naval Air Base (Ford Island). Spec. 8128, to Hawaii Dredging Co., 745 Kaslhumanu St., Honolulu, $53,935. (180 days.)

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Kan., **Greensburg** — City voted bonds for sewers and sewage disposal plant. Paulette & Wilson, Farmers Union Bldg., Salina, engrs. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

N. J., **Cranbury**—Cranbury Twp. soon takes bids constructing complete sanitary sewerage system, embracing sanitary sewer and sewage treatment plant. $87,272. P.W.A. project. Noted Oct. 24, C. D.—Oct. 31, E. N.-R.

Ont., **Ottawa**—Secretary Bd. Control, bids in early spring, for new storm and relief sewers in various streets. Application to Govt. being made for above work. $325,000. F. C. Askwith, City Hall, engr.

BIDS ASKED

Calif., **Los Angeles**—See "Contracts Awarded."

Calif., **San Francisco** — Dpt. P. Wks., City Hall, constructing Marina Sewage Plant, to Healy-Tibbitts Constr. Co., 64 Pine St., Marina; structural work, $96,200; to F. W. S. Snook Co., 596 Clay St., mechanical work, $37,884. Bids Jan. 22. Noted Jan. 24, C. D.

Calif., **Los Angeles**—Mar. 13, by Directors Los Angeles Co. Sanitation Dist. 2, constructing Downey-Bellflower sanitary trunk sewer, incl. 36,398 ft. 18 in. vitr. clay pipe, 15 junction chambers, 500 tons gravel bed, as required, Downey to Pico. To exceed $23,000. A. K. Warren, Law Bldg., engr. Noted Dec. 16, C.D.—Dec. 19, E.N.-R.

Conn., **Danbury**—See "Contracts Awarded."

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C. D. Construction Daily
E. N.-R. Engineering News-Record
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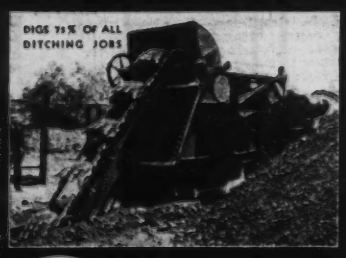

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Sewerage, etc. (Continued)

La., New Orleans—Apr. 2, by Sewerage & Water Bd., furnishing, installing gravity sewers and installing c.i. discharge main, Contr. 119-S; furnishing 24 in. S.I. pipe and fittings for sewage discharge main, Contr. 118-S; furnishing, installing sewers in Algiers, Contr. 116-S; constructing sewage pumping station in Lakeview Sect., Contr. 211-S; furnishing pumps for sewage station to be constructed in Lakeview, Contr. 212-S; furnishing motors, switchboards, transformers, etc., for new proposed sewage station, Contr. 213-S; furnishing c.i. pipe and fittings for proposed sewage station, Contr. 214-S; furnishing underground power cable, Contr. 216-S; installing underground cable for sewage pumping plant, Contr. 217-S.

Mass., Barnstable—Feb. 18, by Town, C. A. Crocker, chn. Bd. Selectmen, Town Hall, Contr. 1, concrete sewers and sewage force main; Contr. 2, sewage pumping station and sewage treatment plant, P.W.A. project 1043-R. $200,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, engrs. Noted May 16, C.D.—May 9, E.N.-R.

Mass., Boston—Feb. 18, by City, C. J. Carven, comr. P. Wks., City Hall Annex, Sect. 14, Stony Brook Sewer, from point 404 ft. northeast of Mt. Hope St., to point 156 ft. southwest of Mt. Hope St., West Roxbury. To exceed $30,000.

Mass., Lynn—See "Contracts Awarded."

Mass., Medford—Feb. 17, by Commonwealth of Massachusetts, Metropolitan Dist. Comn., W. E. Whittaker, secy., 20 Somerset St., Boston, constructing Sect. 111, North Metropolitan Relief Sewer, 5,615 lin.ft. rein.-con. box type sewer line. To exceed $200,000. F. D. Smith, ch. engr. Sewerage Div.

Mass., Medford—Feb. 17, by Commonwealth of Massachusetts, Metropolitan Dist. Comn., W. E. Whittaker, secy., 20 Somerset St., Boston. Sect. 112 of North Metropolitan Relief sewer, involving 5,000 ft. concrete box sewer, in Medford and Winchester. To exceed $150,000. Part of P.W.A. Project 1098.

Mass., Salem—See "Contracts Awarded."

Mass., Winchester—Feb. 19, by Commonwealth of Massachusetts, Metropolitan Dist. Comn., W. E. Whittaker, sec., 20 Somerset St., Boston, P.W.A. Project 1098 (part) Sect. 113 of North Metropolitan Relief Sewer, involving 4,272 ft. rein.-con. box sewer. To exceed $100,000.

Minn., Fairmont—See "Contracts Awarded."

Minn., St. Paul—Feb. 24, by Minneapolis-St. Paul Sanitary Dist., M. Rosen, secy., 1923 University Ave., constructing intercepting sewers and appurtenances, Contr. 112, Div. D, Job 410, incl. 2,884 lin.ft. 11 ft. circular rein.-con. section Type A tunnel, with 2 transition sections, 1,075 ft. 11 ft. circular rein.-con. section Type B tunnel, incl. 2 transition sections, from point near Griggs-St. Anthony Ave., near Victoria St. to St. Anthony Ave. P.W.A. project. C. C. Wilbur, ch. engr.

N. J., Princeton—See "Contracts Awarded."

N. Y., Ithaca — Feb. 25, by Dpt. Health, State Office Bldg., Albany, sewers and water lines at Biggs Memorial Hospital. T. F. Farrell, Albany, State Office Bldg. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., Utica—See "Contracts Awarded."

Pa., Farrell—City, Bd. Control, bids about Mar. 1, storm water sewer in Broadway. $50,000-$60,000. W.P.A. will pay part in addition to labor cost. Material cost $38,200. A. Bauer, Farrell, engr.

Wis., Sheboygan—Feb. 21, by City, constructing intercepting sewers, river crossing and outfall, equipment for sewage treatment plant. P.W.A. project. J. Donohue Eng. Co., Sheboygan, engr.

CONTRACTS AWARDED

Calif., Huntington Beach—City, rein.-con. sewage treatment plant, vitr. pipe outfall, miscellaneous piping and pumping equipment to Hoagland Eng. & Constr. Co., 1st Natl. Bank Bldg., Long Beach. $79,753. Est. $82,000. Bids Jan. 27, awarded Jan. 29. Award subject to P.W.A. approval. Noted Feb. 5, C. D.—Jan. 16, E. N.-R.

★ **Calif., Los Angeles**—Los Angeles Co., constructing 30 in. concrete pipe drain at upper end increasing to 69 in. drainage at Ventura St., connecting with concrete box section, 7x6 ft. which increases to 7x9 ft. at outlet, 2 main branches each 30 in. in diam., concrete pipe, West Altadena Storm Drain, North Marengo Ave. at Los Flores Dr. to Arroyo Seco, relief labor under **W.P.A.** Est. $800,000. A. Jones, Hall of Records, engr.

Conn., Danbury—City, sewage disposal plant (completion) storm sewer in Beaver St. and Rose Hill, W.P.A. labor, $40,174. **W.P.A.** Sanborn & Bogert, 30 Church St., New York, engrs.

Ga., Atlanta—City, City Hall, constructing Unit 1, disposal plant, to McDougald Constr. Co., $25,349. **P.W.A.** Bids Dec. 12. Noted Dec. 4, C.D.—Dec. 5, E.N.-R.

Ga., Newman—City, c/o I. W. Powers, clk., constructing disposal and filtration plant, to Smith Pew Constr. Co., 786 West Peachtree St. N.W., Atlanta, $70,901. Est. $83,000. **P.W.A.** Bids Dec. 14. Noted Dec. 9, C. D.—Apr. 4, E. N.-R.

Mass., Lynn — City, Sewer Dpt., City Hall, clay sewer in Jenness St., $5,000; clay drains, Pine Grove Cemetery, $56,000; clay [illegible] in Hovey and Reed Terraces, $3,000 [illegible] Grove, $3,000; rein.-con. culvert in W[illegible] Flint Sts., $8,000; clay sewer in Will[illegible] $4,000; Street Dpt., City Hall, bitumin[illegible] adam widening Lynnwood Rd., $10,0[illegible] minous macadam extension, Eastern A[illegible] 000, relief labor. Grand total $101,000 Will purchase material. W.P.A.

Mass., Salem—City, F. P. Morse, en[illegible] Hall, concrete pipe trunk line sewer, Lor[illegible] relief labor under **W.P.A.** Est. $52,0[illegible]

Minn., Fairmont—City, constructing [illegible] tile storm sewer from Lake Sisseton to [illegible] section of city, relief labor. $25,000. [illegible] City will order carload of 24 in. tile. [illegible] Anderson, city engr.

N. Y., New York — Dpt. Sanitation, T. W. Hammond, comr., 125 Worth St., electri[illegible] and fixtures in 56th Street Destructo[illegible] Contr. 5, to Consolidated Electric Co., [illegible] East 42nd St., $43,000. **P.W.A.** Bids Jan. 2[illegible] Noted Jan. 6, C. D.

N. Y., New York—Rodgers & Haggerty, general contractors, 500 5th Ave., New York, 1,000 tons reinforcing steel, for Wards Island Sewage Plant, to J. T. Ryerson & Son[illegible] Woodside Ave., Jersey City, N. J., [illegible] Dpt. Sanitation, 125 Worth St.

N. Y., Utica—City, storm sewers in Miller Ave., $2,933; Ridge Rd., $16,868; Sunset Ave.-Nail Creek (near Noyes St.), $19,300; Utica-New Hartford Trunk Sewer, $17,000; Westminster Pl. and Remington Rd., $4,737; Brinkerhoff Ave., $5,390; Webster, Jefferson and Hilton Aves., $22,050, relief labor. Grand total $88,278. **W.P.A.** Noted July 25, C.D.—Aug. 1, E. N.-R.

N. J., Princeton—Town, repairs and alterations to sewage treatment plant $21,984, alterations to sanitary sewerage system $5,113, relief labor. **W.P.A.** M. W. Murphy, State and Montgomery Sts., Trenton, W.P.A. engr.

O., Camden—City, sanitary sewerage system and disposal plant, to Ostram Realty & Constr. Co., 625 Peoples Bank Bldg., Indianapolis, Ind., $36,823. Est. $40,000. **P.W.A.** Noted Jan. 23, E. N.-R.

O., Columbus — City, constructing storm sewers, Part 1, Contr. 56, Oakland Park Ave. Dist., incl. 3,600 lin.ft. 6- to 15-in. vitr. clay pipe, to N. D. Mancini, 297 South High St., $63,305. Est. $77,300. **P.W.A.** Noted Jan. 16, C. D.

Pa., Ambridge—Borough, constructing 8th St. Sewerage System, to M. Manella, Oliver Bldg., Pittsburgh, $146,174. Est. $194,545. Noted Jan. 23, C. D.—Sept. 5, E. N.-R.

R. I., Burrillville—State, Emergency P. Wks. Comn., State Office, Providence, constructing sewage disposal plant at Wallum Lake Sanatorium, to Middlesex Constr. Co., Victory Bldg., Framingham, Mass., $44,000. **P.W.A.** Bids Dec. 26, awarded Jan. 16. Noted Dec. 19, C. D.—Oct. 17, E. N.-R.

Tex., Goldthwaite—City, c/o H. G. Bodkin, mayor, constructing complete sewerage system, incl. vitr. tile collecting system, manholes, cleanouts, rock excav., replacing caliche pavement and sewage disposal plant, to E. L. Dalton, Dallas Bank Bldg., Dallas, $41,893. **P.W.A.** Bids Dec. 14. Noted Dec. 27, C.D.—Nov. 21, E.N.-R.

Wash., Selah — City, sewerage system, incl. 6,130 ft. 10 and 15 in. underdrain pipe, 17,190 ft. 6- to 18-in. sewer pipe, 400 ft. 24 in. outfall, 1,000 cu.yd. foundation gravel, 50 manholes, 10 flush tanks, 1,000 wyes, to L. Colleccion & Co., 2019 Third Ave., Seattle, $40,544. No bids received for sewage disposal plant. New bids to be asked. Total est. $60,000. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

Wash., Yakima—City, furnishing four settling tank units for round tanks and complete digestion tank unit, to Dorr Co., Inc., $23,000 and $6,624 respectively***sludge pump, to Palmer Supply Co., 222 Westlake Ave. N., Seattle, $774. Noted Dec. 9, C. D.—Dec. 12, E. N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Colorado—State Hy. Dpt., Denver, did not open bids Jan. 29, grading 2.389 mi. hy. between Lyons and Estes Park, State Hy. 66, WPSS 401-B, Boulder Co.; railroad underpass with gravel surfaced approaches 2.008 mi. hy. between Pueblo and Ordway on State Hy. 96, Pueblo Co. Will readvertise. Noted Jan. 23, C. D.

Minn., Springfield—Brown Co., C. E. Schmid, aud., widening bridge to permit two 45 ft. spans, 30 ft. roadway over Big Cottonwood River. $40,000. C. N. Robertson, New Ulm, co. hy. engr.

Missouri—State Hy. Dpt., Jefferson City, plans constructing I-beam spans and continuous steel plate girder spans for grade separation over Missouri Pacific and St. Louis-San Francisco R.R., Route 50, Project WPGM 373, Jackson-State Rd. from Kansas City to Jefferson City; rein.-con. deck girder spans over Chicago, Burlington & Quincy R.R., Route 19, Project WPGH 126, Audrain Co.; three 50 ft. rein.-con. deck girder spans over Missouri, Kansas & Texas R.R., U. S. 54, W.P.G.H. 97, Callaway Co.; rein.-con. deck girder bridge over Chicago, Burlington & Quincy R.R., U. S. Rd. 24, Project

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†*Federal Government.*

Bridges, etc. (Continued)

W.P.G.H. 732, Marion Co. bridge over Chicago, Burlington & Quincy R.R. on Route U. S. 54, W.P.G.H. 126, state road from Francis east and west, Audrain Co.; constructing double track I-beam bridge Route 35, W.P.G.H. 715, Clay Co. and single track through plate girder bridge on Route 24, W.P.G.H. 488, Marion Co., both under Chicago, Burlington & Quincy R.R., for grade separation. Railroad preparing plans for 2 bridges for latter project. Total est. $161,000. T. H. Cutler, ch. engr.

★**N. Y., Herkimer**—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, soon takes bids constructing concrete steel grade crossing elimination project, $1,500,000. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

O., Cleveland—Cuyahoga Co., 1 Lakeside Ave., plans altering West Superior Ave. car subway, $420,000. J. McWilliams, 1 Lakeside Ave., co. engr.

Pennsylvania—Pennsylvania Dpt. Hys., Harrisburg, making plans grade crossing elimination project, Lehigh Valley, Jersey Central and D. & H. Railroads. $300,000.

Texas—State Hy. Comn., H. Hines, chn., Austin, and soon takes bids constructing T. and N. O. Railway underpass, approaches and concrete pavement Hy. 22, W.P.G.S. 692-A, Cherokee Co. G. C. and S. Fe R.R. overpass and approaches, Hy. 73, W.P.G.S. 837, Austin Co. $104,000. New P.W.A. project.

Ont., Cataraqui — Kingston Suburban Rd. Comn., plans rein.-con. bridge to eliminate level crossing at Canadian National Ry. tracks, on Hy. 2, near Kingston. $25,000. Engineer not appointed.

Ont., Kemptville—Dpt. Hys., R. M. Smith, deputy minister, Parliament Bldgs., Toronto, plans constructing new bridge over Rideau River at Becketts Landing. $150,000.

Ont., Port Arthur—City, making plans for new concrete bridge over MacIntyre River. $100,000. S. E. Flook, City Hall, engr.

Ont., Toronto—City plans replacing old timber trestle bridges and approaches about 200 ft. largely concrete on Dundas St. west of Lansdowne Ave. $380,000. Work was deleted from 1935 estimates but has been included for 1936. Noted Feb. 20, C. D.—Feb. 28, E. N.-R.

LOW BIDDERS

Kan., Kansas City—Feb. 22, by State Hy. Comn. at office of County Clerk, Kansas City, reconstructing location of bridge, WPMH 731 from the Kansas-Missouri state line on the present US 40, northwesterly 0.1427 mi. WPGM 731 from the end of WPMH 731, northwesterly 0.5651 mi., reconstructing intercity viaduct WPGH 731 and intercity viaduct WPMH 731, Wyandotte Co.

Maine—Feb. 19, by State Hy. Comn., Augusta, for Bangor and Aroostock railroad overpass, rein.-con. foundation and superstructure, 719 cu.yd. and 25,000 cu.yd. fill and approaches, Millinocket Crossing, Millinocket. To exceed $25,000. L. D. Barrows, ch. engr.

New York—Feb. 18, by State Hy. Dpt., A. W. Brandt, comr., Albany, constructing concrete steel highway bridge on Smithville Flats, State Hy. 1827, Chenango Co., $31,370; concrete, steel grade crossing elimination near Varna Crossing on State Hy. 5225, Lehigh Valley R.R., Tompkins Co., $133,402; concrete, steel bridge near Cameron Hills, $67,996; bridge near Hornell, Hy. 5254, $42,160, both Steuben Co.; concrete, steel bridge near Rawson-Hollow Rd., Tioga Co., $25,313 ***bridge near Smithville Flats, Hy. 5260, Chenango Co., $22,408; bridges near Franklin, Delaware Co., $121,464. Total $444,113.

†**North Carolina**—Mar. 3, by Pub. Rds., Shenandoah Life Insurance Bldg., Roanoke, Va., constructing 9 stone, rein.-con. bridges in Shenandoah-Great Smoky Mountains Parkway, Alleghany Co., incl. 5,000 cu.yd. unclassified excav. for channel, 5,500 cu.yd. unclassified excav. for structures, 7,500 cu.yd. unclassified excav. for borrow. H. J. Spelman, dist. engr.

Ohio—Feb. 18, by J. J. Jaster Jr., Ohio Hy. Director, Columbus, improving roadside 1.33 mi. part Sect. K, Cleveland-Buffalo Rd., State Hy. 2, U. S. Route 20, Ashtabula Co., $2,390***Proposal 1, grading, drainage structures, concrete paving 0.863 mi. Sect. A, part Sect. B, Plain City Section Delaware-London Rd., State Hy. 241, U. S. Route 42, Madison Co., $237,875 ***Proposal 2, constructing concrete slab 24 ft. span bridge over Three Mile Run, 0.01 mi. on Sect. A, Delaware-London Rd., $6,305*** improving roadside Sect. A, Akron-Massillon Rd., State Hy. 71, Sect. A, part Sect. Q, Cleveland-Massillon Rd., State Hy. 17, U. S. Route 21, Stark Co., $8,206***grading, drainage structures, improving roadside, concrete paving 4.444 mi. Elida Sect., Sect. L, Lima-Delphos Rd., State Hy. 127, U. S. Route 30-S, Allen Co., $217,705***Proposal 2, constructing 40 ft. concrete beam bridge over Honey Run Sect. "L", Lima-Delphos Rd., State Hy. 127, U. S. Route 30, and constructing 100 ft. span concrete bridge, steel girders, over Ottawa River, 0.045 mi., $35,694***Proposal 3, grading, drainage structures, improving roadside, concrete paving, part Sect. G, Lima-Delphos Rd., State Hy. 127, U. S. Route 30-S, $20,853.

†*Federal Government.*

O., Canton—Bd. Control bids about Mar. 2, brick repaving and resurfacing ¼ mi. Mahoning Rd. N.E. from Sixth St. to Young Ave. N.E. $25,000. P.W.A. share $24,635. J. Shisler, Canton, engr.

Rhode Island—Feb. 17, by State, and Providence Plantations, Div. Contrs., Standards & Purchases, office of State Purchasing Agent, State House, Providence, Davisville Railroad Bridge 369, 80 ft. long, 51½ ft. wide, etc., single span, through truss, Project WPGS 123, North Kingston, to exceed $75,000; Kingston-Station Railroad Bridge 372, 257 ft. long 42½ ft. wide, etc., Project WPGH 47-C, South Kingston, to exceed $200,000.

South Carolina—Feb. 18, by State Hy. Dpt., Columbia, 135 ft. rein.-con. bridge over Southern R.R. and 0.005 mi. plain concrete approaches on Route 5, near Roddy, W.P.G.H. 71, York Co., $13,000; 64 ft. rein.-con., steel bridge under S. A. L. R.R. and earth type surfacing 0.226 mi. approaches on Route 98, W.P.G.S. 373, Marlboro Co., $23,000; 28.6 ft. creosoted timber, rein.-con. and structural steel bridge and 0.273 mi. bituminous surfacing of approaches under Southern R.R., Route 22, near Winnsboro, W.P.G.S. 370-B, Fairfield Co., $36,800; 117 ft. rein.-con. bridge over Southern R.R., on U. S. Route 76, at Camp Fornance, W.P.G.H. 45-B, Richland Co., $21,680; 170 ft. rein.-con. bridge over C. and W. C. R.R. on Route 101, near Woodruff, W.P.G.S. 398-C, Spartanburg Co., $18,100; 140 ft. rein.-con. bridge on Route 22, over Southern R.R. at Silverstreet, W.P.G.M. 319, Newberry Co., $14,000; 90 ft. rein.-con. bridge over B. U. C. R.R., on U. S. Route 176, Union, W.P.M. 403, Union Co., $15,800. J. S. Williamson, hy. engr.

Virginia—See "Streets and Roads."

CONTRACTS AWARDED

California—State Hy. Comn., Sacramento, borings to be made at site of proposed combination hy. and railroad bridge over Pitt River, being constructed in connection with Kennett Dam, Shasta Co., to D. G. Longtin, De Young Bldg., San Francisco, $3,301. Bids Jan. 24, awarded Jan. 30. Noted Jan. 31, C.D.—Jan. 9, E.N.-R.

Kansas—See "Streets and Roads."

Kansas—State Hy. Comn., at office of County Clerk, Liberal (**P. means Project**), Bridge No. 0.9, three 12x12x32 ft., rein.-con., P. 160-12B-FA 456-A, and Bridge No. 13.1, four 14x12x32 ft., rein.-con. beam, P. 283-1-FA 365-C, both Clark Co., to C. E. Gray, Emporia, $5,729 and $9,447 respectively***Bridge 11 units, 40-48-40, continuous I-beam spans, P. 54-2-PWS 69, Seward Co., to O. O. Fuller Constr. Co., Nevada, Mo., $91,784***Bridge No. 7.6, three 14x14x32 ft., rein.-con. beam span, to Cook & Waddell, Ottawa, $5,957***Bridge No. 9.4, five 30 ft., rein.-con. deck girder spans, to Rhoades Constr. Co., Newton, $16,234, both on P. 25-7-FA 492-E, Wichita Co. Grand total $129,151. Bids Jan. 28. Noted Jan. 13, C. D.—Jan. 16, E. N.-R., under "Streets and Roads."

Kansas — State Hy. Comn., McPherson (**P. means Project**), Bridge No. 9.2, three 8x5 ft. rein.-con. beam, P. 36-24A-FA 449-F, Washington Co., and Bridge No. 9.6, two 8x8 ft. rein.-con. beam, same road, to Scherrer & Bennett, 645 Minn. St., Kansas City, $1,427 and $4,022 respectively***Bridge No. 13.5, 70-100-110-100-70, continuous DPG, P. 81-12-FA 296-E, McPherson Co., to G. Knutson, 3520 Main St., Kansas City, Mo., $67,517***Bridge No. 15.2, rein.-con. deck girder, P. 81-12-WPGH 296-E, McPherson Co., to L. G. Barcus, Kansas City, Mo., $47,852***Bridge No. 7.7, three 30 ft. span, P. 36-24A-FA 449-F, Washington Co., to W. H. Harris, Manhattan, $11,500. Grand total $132,318. Bids Jan. 25. Noted Jan. 13, C. D.—Jan. 23, E. N.-R., under "Streets and Roads."

Kansas—State Hy. Comn., at office of County Clerk, Paola (**P. means Project**), to Sandy Hites Co., City Bank Bldg., Kansas City, Mo., Bridge No. 0.2 subway 24 ft.-49 ft.-24 ft., P. 169-22, WPGH 293-G, $12,500; Bridge No. 9.7, P. 169-21-WPGH 293-A, Part 1, $63,601; Bridge No. 5, 60 ft.-70 ft.-60 ft., P. 169-21-WPGH 293-A, Part 2, $20,337, all foregoing in Miami Co.***to A. L. Cook, Ottawa. Bridge No. 0.0 overpass, P. 59-17-WPGH 280-D, Anderson and Franklin Counties, $32,482***to F. H. Freeto, Pittsburg. Bridge No. 3.2, three 40 ft. standard and 5 skewed rein.-con. deck girder spans, P. 57-32-WPGH 372-B, Cherokee and Crawford Counties, $29,096. Grand total $158,016. Bids Jan. 18. Noted Jan. 13, C. D., under "Streets and Roads."

Maryland—State Roads Comn., Baltimore, sidewalk extension, reconstructing balustrades and repairing roadway of existing concrete arch bridge over Marshy Hope Creek, at Federalsburg, Contr. Co-85-1-211, Caroline Co., to Tidewater Constr. Co., Compostella Bridge, Norfolk, Va., $10,239. P.W.A. Bids Jan. 21. Noted Jan. 27, C. D.—Jan. 16, E. N.-R.

Missouri—State Hy. Comn., Jefferson City, bridges over creek and over Drainage Ditch 24, Stoddard Co., to Richmond Constr. Co., Advance***over branch and over McCarty Creek, Vernon Co., to J. M. Roark, Anderson ***over 2 branches and over east branch of Fourche Creek, Ripley Co., to Service Constr. Co., Poplar Bluffs***over Mill Creek, Washington Co., and over Bowman's Branch, Wright

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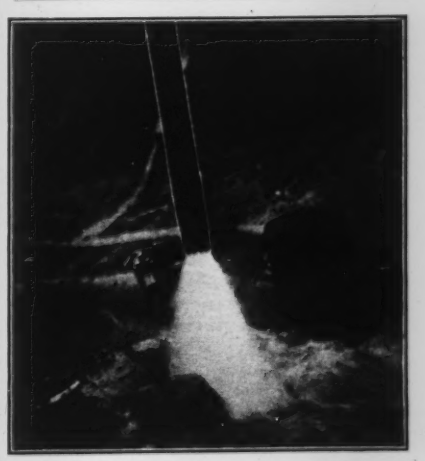

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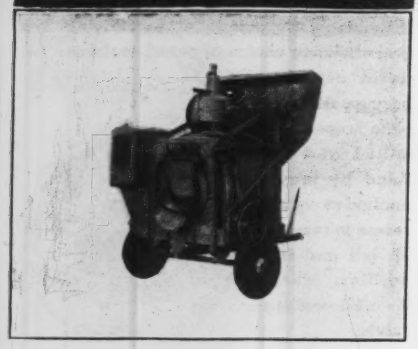

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Bridges, etc. (Continued)

Co., to Neyer Constr. Co., Billings***over James River, Stone Co., to J. A. Kerr, Ozark***over St. L. S. F. R.R., New Madrid Co., to E. L. Markham & E. L. Brown, Cape Girardeau*** over Lateral Ditch 4, Dist. 29, over Main Ditch 4, 2 bridges over Lateral Ditch 3, Mississippi Co., to Linus Penzel, Jackson. Bids Dec. 6 and 20. Noted Dec. 13, C. D.

Nebraska—State Dpt. P. Wks. & Buildings, Div. Hys., Lincoln, to Diamond Eng. Co., Grand Island, culverts in Hall Co., $14,727; bridges same road, $12,393; culverts in Howard Co., $8,652***to Weber & Haring, Box 87, Kearney, bridge in Frontier Co., $24,665***to Central Bridge & Constr. Co., Wahoo, culverts in Adams and Kearney Counties, $22,884; bridge same road, $3,932; culverts in Buffalo Co., $15,544 ***to Weidern & King, Fremont, culverts in Custer Co., $13,413; in Boone Co., $7,014; bridges in Boone Co., $2,134***to Keim Constr. Co., Tecumseh, culverts in Gage Co., $18,297 ***to Interstate Concrete Co., Fairbury, in Jefferson Co., $35,405; in Otoe Co., $27,957*** to C. W. Christ, Sidney, culverts in Morrill Co., $7,199; bridges in same county, $1,412*** to Inland Constr. Co., 3867 Leavenworth St., Omaha, bridges in Otoe Co., $10,208; in Box Butte Co., $10,582***to Western Asphalt Paving Corp., Sioux City, Ia., culverts in Richardson Co., $6,058***to Nichols Constr. Co. & W. G. Hills, Geneva, culvert in Clay Co., $16,461***to Monarch Eng. Co., Falls City, bridge in Clay Co., $3,056***to W. E. Knight, Chapman, culverts in Frontier Co., $102***to Grosshans & Peterson, Sutton, culverts in Red Willow and Frontier Counties, $3,991***to Fullen Constr. Co., Gering, culverts in Box Butte Co., $6,442***to Abel Constr. Co., & A. T. Stewart Co., Lincoln, culverts in Harlan Co., $1,029. Grand total $273,548. Bids Jan. 30.

New Mexico—See "Streets and Roads."

N. Y., Fort Wadsworth—Transit Comn., 270 Madison Ave., New York, reconstructing bridge carrying tracks of S.I.R.T. Ry. across St. Johns Ave., to Bates & Rogers, 940 Tompkins Ave., Staten Island, $58,333. P.W.A. Bids Jan. 21. Noted Feb. 3, C. D.—Jan. 23, E. N.-R.

N. Y., Glendale—Transit Comn., 270 Madison Ave., New York, eliminating grade crossing at 80th St. (Dry Harbor Rd.), Montauk Div. of Long Island R.R., to Wilson & English, Inc., 50 Church St., New York, $171,253. P.W.A. Bids Jan. 31. Noted Jan. 8, C. D.—Jan. 16, E. N.-R.

★ **New York** — Triborough Bridge Authority, 111 8th Ave., New York, lighting system for Triborough Bridge connecting Manhattan, Bronx and Queens Boros, Contr. 57, to Brown Electric Co., 250 East 43rd St., New York, $561,863. P.W.A. Bids Jan. 23. Noted Jan. 24, C. D.—Jan. 9, E. N.-R.

N. Y., Carmen—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, constructing grade separate elimination, to Foley Bros., 135 East 42nd St., New York. General contractor awarded contract 250 tons reinforcing steel, to Albany Steel & Iron Co., Troy Rd., Albany.

Ont., Port Arthur—S. E. Flook, city engr., City Hall, constructing subway at Canadian Pacific Ry. tracks and Nipigon Hy., to Barnett McQueen Constr. Co., 460 Christina St. Noted Jan. 17, C. D., under "Unclassified."

Vermont—State Hy. Dpt., Montpelier, rein.-on. railroad overpass with gravel and refined tar approaches at Cob's Crossing on Route U. S. 5, WPGH 115-D, St. Johnsbury, to E. C. Hayden, Barre, $59,841. Bids Jan. 24, awarded Jan. 31. Noted Jan. 28, C. D.

Wash., Mt. Vernon—Skagit Co., 875 ft. bridge, incl. approaches, Swinomish Slough, to Manson Constr. Co., Canadian National Dock, Seattle, $117,753. Est. $120,000. P.W.A. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

STREETS AND ROADS

BIDS ASKED

California — Feb. 27, by State Hy. Comn., C. H. Purcell, engr., 808 State Bldg., Los Angeles, grading, liquid asphalt treating shoulders 14.4 mi. hy. from Riverside to Ontario, San Bernardino and Riverside Counties, To exceed $23,000.

Conn., Bridgeport—See "Contracts Awarded."

Louisiana — Feb. 19, by State Hy. Comn., Baton Rouge, roadside improvement 1.96 mi. Tallulah-East and South Hy., Routes 3 and 4, F.A. Projects 125-A reopened, 53 reopened and 181-B, State Project 4251, Madison Parish.

New Jersey—State Hy. Dpt., Trenton, rejected bids Feb. 3, grading, rein.-con. paving 70,500 sq.yd., Route 25, Sect. 26, Robbinsville to Hightstown, Mercer Co. Noted Jan. 16, C. D. —Jan. 23, E. N.-R.

★ **North Carolina**—Feb. 18, by State Hy. & P. Wks. Comn., Raleigh, grading, concrete paving 1.05 mi. Martin Co.; 0.26 mi. Pasquotak Co.; grading, bituminous surfacing 7.67 mi. Nash Co.: grading, bituminous surfacing 11.32 mi. Duplin Co.; surfacing and overhead crossing 0.16 mi. over Norfolk & Southern R.R., Wake Co.; grading 5.61 mi., Lincoln Co.; 6.55 mi., Wake Co.; 6.61 mi. Rockingham Co.; grading, and overpass Seaboard Air Line R.R. between Tramway and Jonesboro, Lee Co.; concrete paving 0.39 mi. and underpass S. A. L. R.R. Wake Forest, Wake Co.; concrete p[illegible] mi., Rockingham Co.; 1.18 mi., [illegible] Co., bituminous concrete surfacing, [illegible] Rowan Co. $665,000.

South Carolina—Feb. 18, by State Hy. Dpt. Columbia, earth type surfacing 3.188 mi. Route 901, W.P.S.S. 419-A, Chester Co., [illegible] 45,000 cu.yd. excav. and surfacing [illegible] 2,323 mi. Route 511, W.P.S.S. 413-[illegible] town and Williamsburg Counties, 22[illegible] excav. and surfacing, $16,200; 9.543 mi. Route 101, W.P.S.S. 398-B, Spartanburg Co., [illegible] cu.yd. excav. and surfacing, $91,300; 4.06 mi. Route 73, W.P.M.S. 427-A and W.P.S.S. [illegible] Dillon Co., 52,600 cu.yd. excav. and surfacing, $40,000; bituminous surfacing 4.284 mi. County Rd., W.P.S.O. 395-B, Clarendon Co., [illegible] cu.yd. excav., $60,000; earth grading 7.59 mi. Route 701, W.P.S.S. 414, Georgetown Co., and 76 ft. combination bridge over Chopee Creek on Route 51, 29,927 cu.yd. excav., [illegible] $24,800; earth type surfacing 3.001 mi. hy., [illegible] earth type surfacing 3.001 mi. hy., W.P.H. [illegible] Bamberg Co., and 150 ft. combination bridge over Lemon Swamp, on Route 33, 50,000 cu. yd. excav. and surfacing, $38,400; concrete paving 0.339 mi. U. S. Route 76, approaches to bridge over Southern Railroad at Camp Fornance, W.P.G.H. 45-B, Richland Co., 23,400 cu.yd. excav., $40,000; bituminous surfacing 0.263 mi. Route 22, approaches to bridge over Southern R.R. at Silverstreet, W.P.G.H. 325 and W.P.G.M. 319, Newberry Co., 40,000 cu. yd. excav., $20,400; earth type surfacing 0.384 mi. Route 101, approaches to bridge over and W. C. R.R. near Woodruff, W.P.G.S. 398-C Spartanburg Co., 41,350 cu.yd. excav., $27,200. J. S. Williamson, hy. engr.

Virginia—Feb. 25, by State Hy. Dpt., Richmond, concrete paving 0.07 mi. Route 29, Sec. Project WPMH-134-M5, Fed. Project WPMH-330-B, Campbell Co., 155 cu.yd. excav.; 2 mi. Route 1, State Project 358-KW3B4, 5, Fed. Project 362-D, Caroline Co., 7,216 cu.yd. excav., surface treating and constructing overhead crossing near Markham, Route 55, State Project WPGH-725-EB3, Fed. Project WPMH-491-A, Fauquier Co., 36,518 cu.yd. excav.; grading, draining 1.7 mi. Route 42, State Project WPSS-763-A1, Fed. Project WPSS-549-A, in Millboro Springs, Bath Co., 55,494 cu.yd. excav., bituminous paving 0.6 mi. WPMS-781-F1, Fed. Project WPMH-781-f2, 77C, in Farmville, 1,896 cu.yd. excav.; surface treating and constructing 3 bridges on Route 311, WPSS 1007-C1B1, 2, 3, WPSS-499-B, Alleghany Co., 37,033 cu.yd. excav.; rein.-con. paving 0.5 mi. Route 60-66-E, WPMH 1039-L, WPMH 1939-J, in Newport News, 875 cu.yd. excav.; curbing and guttering 0.1 mi. Route 460, State Project WPMH-1051-M21 Federal Project WPHM-342-G, in Crewe.

Ont., Doghole Bay—See "Contracts Awarded."

Ont., Ottawa—Bids in early spring by Secretary Bd. Control, City Council, applying to Ont. Govt. for authority for new pavements on various streets and new sidewalks. $200,000.

CONTRACTS AWARDED

Alabama — State Hy. Comn., Montgomery, G. Scott, pres., grading, draining, temporary surfacing 1.7 mi. Birmingham-Jasper Rd., WPMH 59-2, to S. R. Batson, Birmingham, $176,191***1.171 mi. Birmingham-Jasper Rd., WPMH 59-3, to Dunn Constr. Co., Chamber of Commerce Bldg., Birmingham, $125,735***1.48 mi. Birmingham-Jasper Rd., WPMH 59-1 and Ext., to H. E. Wolfe, St. Augustine, Fla., $172,748, all foregoing in Jefferson Co. Grand total $474,674. Bids Nov. 22.

★ **Arizona**—State Hy. Dpt., Phoenix, improving 8.8 mi. road in Maricopa Co., to Henry & Garnett Glendale, Calif., $202,300 est. $208,000***2.1 mi. Mohave Co., to G. W. Orr, El Paso, Tex., $154,805 est. $235,000***underpass near Peoria, Maricopa Co., to Faley Corp., 4430 Boundary St., San Diego, Calif., $102,400 est. $145,000. Grand total $459,508. P.W.A. Bids Jan. 18. Noted Jan. 30, C. D.

Arizona—State Hy. Comn., Phoenix, grading, draining 2 mi. Safford-Bowie Hy., Graham Co., to Tiffany Constr. Co., Phoenix, $45,535. Est. $50,000. Bids Jan. 23. Noted Jan. 17, C. D.

Conn., Bridgeport—City, bituminous macadam paving, grading, cutting new roads, Golddale, Salem, Anton, Eckart, Exeter, Van Girard Sts., Old Town and Chopsey Hill Rds., Garfield, Cleveland and Glendale Aves., W.P.A. labor $474,000. P. Brewster, dir. P. Wks. F. Toquet, City Hall, engr.

Ill., Belleville — City, concrete paving 0.71 mi. North Illinois St. from Public Square to city limits, to Hoeffken Bros. Constr. Co., 222 West B St., $61,887.

Indiana—State Hy. Comn., Indianapolis, rein.-con. paving 9.462 mi. road in Clay Co., to U. R. Price & Co., Bloomington. $281,206 Est. $342,608. Bids Oct. 29. Noted Nov. 1 C. D.—Oct. 17, E. N.-R.

Indiana — State Hy. Comn., Indianapolis, waterbound macadam and bituminous paving 7.345 mi. Steuben Co., to Carvey & Tombaugh Macy, $174,397 est. $202,623***graveling 4.76 mi. Boone Co., to C. W. Bridges, Coatesville, $23,153 est. $27,486***7.619 mi. Gibson Co., to Gast Constr. Co., Warsaw, $78,825 est. $93,043***bituminous retread and bituminous material resurfacing 6.566 mi. Marion Co., to L. Dehmer, Kokomo, $109,720 est. $120,700 ***rein.-con. paving 0.857 mi. Tippecanoe Co.

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†*Federal Government*

Streets and Roads (Continued)

to D. M. Vaughn, 619 South 10th St., Lafayette, $51,778 est. $72,055. Grand total $437,-873. Bids Jan. 7. Noted Jan. 10, C. D.

Indiana—State Hy. Comn., Indianapolis, crushed stone surfacing 12.157 mi. road in Pike Co., to C. Myers, Campbellsville, $112,644 est. $146,333; 6.371 mi. Fulton Co., to Gross Constr. Co., Laporte, $92,372 est. $108,318. Bids Jan. 7. Noted Jan. 10, C.D.

Kansas—State Hy. Comn., at office of County Clerk, Hill City (**P. means Project**), to M. W. Watson, National Bank of Topeka Bldg., Topeka, light type surfacing 3.371 mi. P. 21-15-FA 413-A, $3,524; 8.581 mi. P. 21-15-FA 413-C, $8,971, both Graham Co.; 1.054 mi. P. 36-1-FA 145-A, Cheyenne Co., $1,264***to D. G. Hansen, Logan, 0.709 mi. P. 21-18-FA 496-A1, $848; 6.957 mi. P. 21-18-FA 496-B, $8,321, both Norton Co.; 7.03 mi. P. 183-1B-FA 462-B, Decatur Co., $9,184***to D. H. Hardman, Alton, 3.577 mi. P. 7-19-FA 520-A, Osborne Co., $4,878; 12.283 mi. P. 9-6-FA 516-A, Smith Co., $16,207***to San Ore Constr. Co., McPherson, 0.576 mi. P. 36-5-WPMS 510-A, $648; 1.89 mi. P. 36-5-WPSS 510-A, $2,124; 2.966 mi. P. 36-5-WPSS, $3,333; 3.04 mi. P. 36-5-WPSS 510-C, $3,417, all foregoing Rawlins Co.***to List & Clark, Railway Exch. Bldg., Kansas City, Mo., earthwork and culverts 1.054 mi. P. 36-1-FA 145-A, $62,872; Bridge No. 13.6, three 8x8x32 ft., rein.-con., P. 36-1-FA 145-A, Cheyenne Co., $3,227***to L. F. Harper, Great Bend, earthwork and culverts 5.593 mi. P. 21-16-FA 496-D, $38,603***to N. Ralph Sanford, Hoisington, Bridge No. 3.9, five 14x14 ft. skew rigid frame span, $13,841; Bridge No. 5.6, two 9x9x37 ft. rein.-con., $2,784, all foregoing on P. 21-16-FA 496-D, Graham Co, Grand total $184,046. Rejected bids opened Jan. 24, 4 bridges, P. 18-5-PWS 24, Russell Co. Bids Jan. 24. Noted Jan. 13, C. D.—Jan. 23, E. N.-R.

Kansas—State Hy. Comn., at office of County Clerk, Liberal (**P. means Project**), to M. W. Watson, Natl. Bank of Topeka Bldg., Topeka, light type surfacing 0.568 mi. P. 54-11-FA 427-C, $686; 4.23 mi. P. 54-12-WPSS 489-A, $5,059; 0.332 mi. P. 54-12-WPMS 489-A, $398, all foregoing in Ford Co.***to Yant Constr. Co., 1115 Omaha Natl. Bank Bldg., Omaha, Neb., 12.472 mi. P. 21-11-FA 514-B, $10,358; 4.506 mi. P. 21-12-FA 514-C, $3,743, both in Ness Co.***to San Ore Constr. Co., McPherson, 4.91 mi. P. 160-12B 456-B, $5,497; 3.295 mi. P. 283-3-FA 456-C, $3,689***to C. E. Gray, Emporia, earthwork and culverts 2.287 mi. P. 160-12B-FA 456-A, $21,846; 0.948 mi. P. 283-1-FA 365-C, $17,808, all foregoing in Clark Co.***to A. L. Cook, Ottawa, earthwork, culverts, sand gravel surfacing 11.509 mi. P. 54-2-WPSS 480-C, Seward Co., $118,608***to Cook & Waddell, Ottawa, earthwork and culverts 10.766 mi. P. 25-7-FA 492-E, Wichita Co., $28,353***to Cook & Cone, Ottawa, light type surfacing 14.796 mi. P. 27-8-FA 515-A, Greeley Co., $14,844. Grand total $230,889. Bids Jan. 28. Noted Jan. 13 C. D.—Jan. 16, E. N.-R.

Kansas—State Hy. Comn., at office of County Clerk, McPherson (**P. means Project**), to Scherrer & Bennett, 645 Minn. St., Kansas City, Mo., earthwork and culverts 1.899 mi. P. 81-12-WPH 296-E, Parts 1 and 2, $47,428; 0.521 mi. P. 81-12-WPGH 296-E, $32,731, both McPherson Co.; 4.498 mi. P. 36-24A-FA 449-F, Washington Co., $62,089***to B. Metzger, Ozawkie, light type surfacing 2.506 mi. P. 13-7-FA 363-E, Morris Co., $3,441; resurfacing 1.6 mi. P.77-19-6697, Geary Co., $179***to Yant Constr. Co., 1115 Omaha Natl. Bank Bldg., Omaha, Neb., light type surfacing 3.934 mi. P. 36-24A-FA 449-D, $3,085; 0.036 mi. P. 36-24A-FA 449-E, $29, both in Washington Co. ***to H. J. Taylor Constr. Co., Salina, concrete paving 2.456 mi. P. 81-16-FA 44-ABE, Saline Co., $60,540***to Clifton Sand Co., Clifton, resurfacing 7.1 mi. P. 15-20B-6709, $1,619; 4 mi. P. 80-1-6710, $888; 5.2 mi. P. 15-20A-6711, $1,186; 14 mi. P. 9-18-6708, Washington Co., $3,584***to D. L. Wheelock Constr. Co., Clay Center, 10.1 mi. P. 15-19B-6712, $3,293; 5 mi. P. 15-19A-6713, $1,630, all foregoing in Clay Co.***to D. G. Hansen, Logan, 12 mi. P. D-9-15-8091, Cloud Co., $1,152*** to San Ore Constr. Co., McPherson, 7.4 mi. P. 15-17-6714, Dickinson Co., $1,658***to De Soto-Kansas River Sand Co., De Soto, 15.3 mi. P. 14-4-6690, $2,540; 12.4 mi. P. 14-15B-6692, $2,331, both in Ellsworth Co.; 12.7 mi. P. 14-16-6691, Lincoln Co., $3,226***to M. W. Watson, Natl. Bank of Topeka Bldg., Topeka, 10.1 mi. P. 15W-24-6707, Washington Co., $2,-606. Grand total $235,235. Bids Jan. 25. Noted Jan. 13, C. D.—Jan. 23, E. N.-R.

Kansas—State Hy. Comn., at office of County Clerk, Paola (**P. means Project**), to A. G. Sherwood Constr. Co., Independence, earthwork, culverts, concrete paving 0.446 mi. P. 169-21-WPGH 293-A, Part 2, $44,524; 0.083 mi. P. 169-21-WPH 293-A, Part 3, $4,827; 0.029 mi. P. 169-22-WPGH 293-G, $3,014***to M. E. Gillioz, Monett, Mo., 0.533 mi. P. 169-21-WPMH 293-A, $60,710; 0.607 mi. P. 169-21-FAP 293-A, $64,636, all foregoing in Miami Co.; earthwork, culverts, light type surfacing 0.546 mi. P. 59-17-WPGH 280-D, Anderson and Franklin Counties, $41,809; earthwork, culverts 0.465 mi. P. 57-32-WPGH 372-B, Cherokee and Crawford Counties, $26,993***to Harrison Eng. & Constr. Co., Fairfax Bldg., Kansas City, Mo., earthwork, culverts, concrete paving 2.442 mi. P. 59-11-FA 21-AB, Allen Co., $118,922. Grand total $365,435. Bids Jan. 18. Noted Jan. 13, C. D.

Kansas—State Hy. Comn., Topeka, crushed stone or gravel and fine aggregate surfacing, concrete hand rail 0.525 mi. Project 75-25-A-WPGM 46 C, Shawnee Co., Parts 1 and 2, to Missouri Valley Bridge & Iron Co., Leavenworth, Part 1, $250,750; Part 2, $365,583. Bids Jan. 30.

Mass., Lynn—See "Sewerage and Waste Disposal."

Missouri—State Hy. Dpt., Jefferson City, to H. D. and B. M. Thomas, Fulton, graveling 3.253 mi. Wellsville-Middletown Rd., WPSO 765B, $11,428; 4.911 mi. WPSO 765A, same road, $19,716***to E. L. Markham, Cape Girardeau, 0.173 mi. Missouri Pacific overhead to Route D, Butler Co., $4,594; 0.021 mi. same road, Sect. 283F, $716***to J. L. Pohl, Nevada, crushed stone surfacing 3.621 mi. Milna-Harris Rd., WPSO 632A, $26,083; 0.326 mi. WPSO 632C, $11,064, both Sullivan Co. ***to J. M. Roark, Anderson, graded earth surfacing 4.287 mi. Mil-Montevallo Rd., WPSO 676A, $27,961; 4.989 mi. WPSO 676B, same road, $20,259, both Vernon Co.***to Neyer Constr. Co., Billings, 3.295 mi. Route 21-Irondale Rd., WPSO 507A, $10,509; 2.339 mi. WPSO 507B, same road, $15,052; 0.79 mi. WPSO 507C, same road, $22,388, all foregoing Washington Co.; 4.25 mi. Wright Co., $32,323 ***to Vaughn Constr. Co., Kirksville, graveling 1.944 mi. Scotland Co., $7,054***to Linus Pengel, Jackson, 0.303 mi. Mississippi Co., $16,-923***to Richmond Constr. Co., Advance, 0.44 mi. Stoddard Co., $16,575***to J. A. Kerr, Ozark, 1.238 mi. Stone Co., $28,597***to General Constr. Co., Kansas City, 2.424 mi. Mercer Co., $12,275***to Service Constr. Co., Poplar Bluffs, 4.829 mi. Ripley Co., $33,510***to E. L. Markham & R. E. Brown, Cape Girardeau, 0.477 mi. New Madrid Co., $67,170. Grand total $384,197. Bids Dec. 6 and 20. Noted Dec. 13, C. D.

★ **Nebraska**—State Dpt. Roads & Irrigation, Lincoln, to P. Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha, Neb., grading 7.4 mi. Hall Co., $30,783; 5.2 mi. Box Butte Co., $21,702***to Central Bridge & Constr. Co., Wahoo, 10.1 mi. Adams and Kearney Counties, $38,973; :6.4 mi. Buffalo Co., $23,870***to Roberts Constr. Co. and R. C. Franke, Lincoln, 7.7 mi. Custer Co., $41,656; 8.9 mi. Howard Co., $44,935***to Roberts Constr. Co., Lincoln, grading 9.8 mi. Gage Co., $44,343; 14.8 mi. Jefferson Co., $83,202; 5.3 mi. Clay Co., $32,243***to A. C. Ross, Bayard, 4.3 mi. Morrill Co., $15,210***to Western Asphalt Paving Corp., Sioux City, Ia., 2.9 mi. Richardson Co., $14,984***to W. B. Knight, Chapman, 0.6 mi. Frontier Co., $4,993; 0.8 mi. Red Willow and Frontier Counties, $15,259 ***to Weidner & King, Fremont, 2.8 mi. Boone Co., $9,946***to J. B. Bertrand, Union Station, Denver, Colo., 0.7 mi. Hitchcock Co., $6,797 ***to Grosshand & Peterson, Sutton, 2.7 mi. Harlan Co., $15,605***to J. N. Einung, Wayne, sand graveling 8.6 mi. Wayne Co., $5,320. Grand total $483,268. Bids Jan. 30. Noted Jan. 27, C. D.

New Mexico—State Hy. Comn., Albuquerque, grading, drainage structures, 15 multiple span concrete box culverts, 2 concrete, steel bridges, 11.1 mi. road in Rio Arriba Co., to New Mexico Constr. Co., Albuquerque, $294,088. Est. $324,-696. Bids Jan. 21. Noted Jan. 22, C. D.

N. Y., Brooklyn — R. V. Ingersoll, pres., Brooklyn Boro, Boro Hall, asphalt paving Claremont Ave., to Mill Basin Asphalt Corp., East 54th St. and Avenue U, $23,298***Hendrix and Herkimer Sts., to B. Turecamo Contg. Co., New Cropsey Lane, $5,-596 and $25,105 respectively***Madison St., to Highway Impvt. & Repair Co., Meserole St., $26,400. Grand total $80,399. Bids Jan. 8. Noted Jan. 9, C. D.—Jan. 2, E. N.-R.

N. Y., New York—S. Levy, pres. Manhattan Boro, Municipal Bldg., asphalt repaving West 77th St., to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., $23,847***asphalt repaving former car tracks, to Highway Impvt. & Repair Co., Furmans Island, Brooklyn, $60,250 ***granite surfacing car tracks, to E. T. Barry, 126-06 139th Ave., Laurelton, $23,800. Grand total $107,897. Bids Jan. 21. Noted Jan. 22, C. D.

Tex., Houston—Harris Co., c/o H. L. Washburn, aud., grading, drainage structures surfacing 3.375 mi. Sheldon-Deer Park Rd., P.W.C. 1041-52, to Brown & Root, Inc., 4300 Calhoun Rd., Houston, $21,170***5.215 mi. Dyersdale-East Houston Rd., P.W.C. 1041-38, to Gulf Bitulithic Co., 2820 Polk Ave.***7.732 mi. Cypress-Rose Hill, P.W.C. 1041-32, to Haden & Austin, 1st Natl. Bank Bldg., $57,555. **P.W.A.** Bids Jan. 3. Noted Dec. 30 and Jan. 2, C.D.

Tex., Palestine — Comrs. Court of Anderson Co., c/o J. M. Moore, judge, Palestine, rein.-con. drainage structures on county roads, to Austin Bridge Co., 1813 Clarence St., Dallas, $81,636. Est. $90,000. **P.W.A.** Bids Dec. 10. Noted Dec. 5, C. D.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, gravel mixed in place surface course with refined tar 1.3 mi. U. S. Route 5, WPH 135-F, Rockingham, to F. W. Whitcomb, Bellows Falls, $59,617; grading base and drainage with double tack coat refined tar surfacing 0.9 mi. FAP 75-D, Wallingford, to E. L. Somers, Inc., Barre, $27,022. Bids Jan. 24, awarded Jan. 31. State Hy. Dpt., returned unopened bits to have been opened Jan. 24, for improving hy. WPSO 212-A, Elmore and WPSO 199-A, Lunenburg, will readvertise. Noted Jan. 28, C. D.

Washington—L. V. Murrow, dir. Hys., Olympia, concrete paving 0.5 mi. 29th Ave. between Grand Blvd. and Perry St., 0.7 mi. Napa St. between Trent and Mission Aves., to C. A.

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†*Federal Government.*

Ransome

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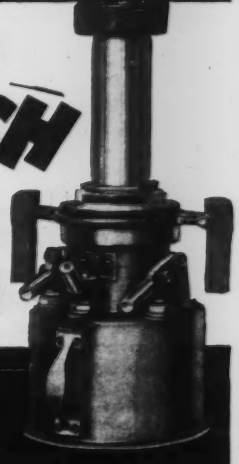

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Streets and Roads (Continued)

Power, Spokane. $23,211 and $35,296 respectively.

Washington — State Hy. Dpt., Olympia, asphaltic concrete resurfacing Holly St., widening and repaving with concrete Meridian St. and Guide Meridian Rd. in Bellingham, to Washington Asphalt Co., 17 West Lander St., Seattle, $49,845. Bids Jan. 14. Noted Jan. 8, C. D.

Ont., Dogbole Bay—Ontario Dpt. Northern Development, Parliament Bldg., Toronto, constructing 23 mi. road to Pickle Lake, day labor. $100,000.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

Conn., Woodmont—City of New Haven, M. M. Daly, dir. Works Progress, City Hall, New Haven, making plans stone, concrete breakwater of Woodmont Shore Resort. $146,570. E. Nettleton, City Hall, New Haven, engr.

★ **Minn, Madison**—State, c/o Lac qui Parle Protective League, L. A. Hancock, pres., Appleton, plans flood control, incl. dam and flood control works in Minnesota River, near Montevideo and reversing weir in Chippewa River with 8 mi. channel to divert flood waters into Lac qui Parle reservoir, 206,000 cu.ft. storage capacity. $2,235,000. W.P.A. project. J. J. Idzorek, Appleton, superv. engr.

Minn., Rochester—City plans constructing mono concrete dam at Silver Lake with 219 ft. spillway and 3 tainter gates. $40,000. C. H. Armstrong, city engr.

†**Washington**—Bureau Reclamation, Yakima, plans nearing completion constructing 5 mi. canal from Yakima River crossing to mouth of Tunnel 3, Rosa Irrigation Project. C. E. Crownever, 204 4th Ave. N., Yakima, engr.

Alaska, Juneau—City plans constructing small boat harbor. $163,000. M. D. Williams, army engr., made surveys.

BIDS ASKED

†**Nev., Boulder City** — Feb. 20, by Bureau Reclamation, Custom House, Denver, Colo., miscellaneous metal work and transite for Boulder Power Plant, Boulder Canyon Project, Arizona-California-Nevada.

N. J., Newark—See "Contracts Awarded."

N. Y., Geneva—See "Contracts Awarded."

Pa., Gettysburg—See "Contracts Awarded."

CONTRACTS AWARDED

†**Florida**—U. S. Eng., Jacksonville, dredging intracoastal waterway in Port Orange Relocation Cut, to Milling Dredging Co., Inc., Delray, $23,492. Bids Jan. 10. Noted Jan. 20, C. D.—Dec. 26, E. N.-R.

†**Mass., Lynn**—U. S. Eng., 37 Marginal St., Chelsea, furnishing, installing stone rip rap around lighthouses, to M. and R. Constr. Co., 25 T Wharf, Boston, $1,800. Bids Jan. 21, awarded Jan. 31. Noted Jan. 29, C. D.

Mo., Cape Girardeau—Little River Drainage Dist., 33 mi. ditch cleanout, incl. 139,390 cu. yd. excav., to W. Crumpecker, Morehouse, 14c. per cu.yd., total $19,515. Bids Dec. 16. Noted Dec. 5, C. D.

N. J., Newark—Essex Co., repairing and replacing drainage system, paths, walks, etc., throughout county, relief labor. $53,037. **W.P.A.** W. Stickles, Court House, engr.

N. Y., Geneva—City, City Hall, drainage of swamp areas in and near here for mosquito elimination project, relief labor. $25,000. **W.P.A.** J. W. Brennan, c/o owner, engr.

Pa., Gettysburg—Comrs. Adams Co., reconstructing Mary's Dam on Big Marsh Creek, 1 mi. from Ortana, and reconstructing Hartman's dam on Big Marsh Creek, ¼ mi. from Hilltown, both Franklin Twp., day labor. To exceed $17,500. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

UNCLASSIFIED

PROPOSED WORK

★ **Ala., Mobile**—PIERS, etc.—Free Port Zone, c/o mayor, Mobile, plans piers, warehouses, barriers, etc., for construction of Free Port Zone. To exceed $1,000,000. **Maturity indefinite.** Federal permit not yet granted for this project.

Calif., Stockton—AIRPORT—City completing plans improving airport involving 120 ft. 21 in. 950 ft. 15 in., 20 ft. 12 in., 3,390 ft. 8 and 10 in. pipe drainage system in 1st unit; 12 in. well and pump and pressure water system; sewerage system with 2,700 ft. 8 in. pipe, administration building, 2 additional hangars, night lighting system. $180,000. L. Payton, city engr. Noted May 15, C. D. — May 23, E. N.-R.

★ **Calif., Stockton**—POWER DEVELOPMENT —City Council, considering proposal to purchase water rights and hydro-electric properties of the Utica Mining Co. on North Fork of Stanislaus River. $750,000. Expenditure of $1,700,000 is contemplated to enlarge power plant installation and to transmit the power to Stockton for sale by the municipality.

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Calif., Stockton — TRANSIT SHED — Port Dist., plans dock and transit shed. $909. P.W.A. funds granted. Eng. Dpt. owner, engrs. Noted Sept. 18, C. D.—Sept. E. N.-R.

Mich., River Rouge — GAS HOLDER — "Industrial Buildings."

Minn., Hibbing—AIRPORT—Village, V. L. Cole, recdr., plans constructing municipal port. $24,000.

Mont., Butte—AIRPORT—City, T. Ferg clk., plans municipal airport. $50,000. W. project. M. Loughran, city engr.

N. Y., Leon—GAS DEVELOPMENT—Bel Quadrangle Drilling Co., Box 373, Brad Pa., J. B. Cleaves, secy., plans developing natural gas field, near here, incl. drilling se 3,700 to 3,800 ft. wells, each requiring to 3,000 ft. 6¼ in pipe, etc. **Maturity at** $300,000 or more.

N. C., Wilson—RURAL POWER LINE — Town, J. L. Wiggins, mgr., will seek loan Federal Rural Electrification for building mi. rural power lines. $180,681. D. Ba State R.E.A. dir., Raleigh.

O., Cincinnati—GRANDSTAND—City B ball Club, Union Central Bldg., soon takes on rebuilding left and right field wings grandstand, and other improvements. $17, plus. H. Hake, 2400 Gilbert St., archt.

O., Dayton—SWIMMING POOL—Mrs. H. Carnell, 3rd Natl. Bank Bldg., made plans soon takes bids 40x120 ft. pool, dancing race, shelter house, on Patterson Field, here. Schenck & Williams, 3rd National Bank Bldg., archts.

O., Fairfield—SWIMMING POOL, etc.—Mrs. H. G. Carnell, c/o Schenck & Williams, archts. and engrs., 3rd Natl. Bank Bldg., Dayton, plans 40x120 ft. swimming pool, filtration plant, etc.

Pa., Franklin—AIRPORT—City plans development of municipal airport, incl. grading, runways, hangars and administration building. $105,000. May apply for federal funds to finance. J. McK. Snow, city engr.

Pa., Tipton—AIRPORT—City of Altoona and Blair Co. Comrs., E. E. Stall, dir. Dpt. Parks & Public Property, City Hall, Altoona, plans to take over Stutz Field, near here and develop same into modern airport, incl. grading, constructing 100 ft. wide runway, hangar, administration building, lighting system, etc. $178,000. W.P.A. project. Government will allot $167,000 toward estimated cost. **Maturity in spring.**

Tex., Kilgore—SWIMMING POOL—City, soon takes bids 70x150 ft., swimming pool, 1 to 8 ft. deep, $30,000. A. P. Noyes, Henderson, engr. Noted Sept. 9, C. D.—Sept. 12, E. N.-R.

Tex., San Antonio—TRANSMISSION LINES —San Antonio Public Service Co., St. Marys and Crockett Sts., plans extending electric power to rural communities in and near Bexar Co., about 45 mi. of wiring will be constructed.

Wash., Hoquiam — DOCK — City, City Hall, plans dock to care for harbor for fishing boats. $70,000. W.P.A. project. W. L. Lovejoy, City Hall, engr.

Wash., Spokane—AIRPORT—City, City Hall, plans levelling felts municipal field and building asphalt runways and new hangar. $323,935. A. D. Butler, City Hall, engr.

N. B., Fredericton—HYDRO-ELECTRIC DEVELOPMENT—New Brunswick Power Comm. plans survey for supply of hydro-electric energy in Carleton and Victoria Counties.

Que., Quebec City — TUNNEL — E. Hamel, city engr., preparing plans and estimates for tunnel on Canadieve Rd. $241,000.

BIDS ASKED

Calif., Bakersfield—HANGAR, etc.—See "Contracts Awarded."

Calif., Los Angeles—PARK DEVELOPMENT —See "Contracts Awarded."

Conn., Norwalk—PLAYGROUND—See "Contracts Awarded."

Ill., Carbondale—STADIUM—See "Contracts Awarded."

Mass., Framingham—ATHLETIC FIELD—See "Contracts Awarded."

Mass., Lynn — STADIUM — See "Contracts Awarded."

Miss., Cleveland — SWIMMING POOL — See "Contracts Awarded."

Miss., Pascagoula—AIR FIELD—See "Contracts Awarded."

N. J., Collingswood—STADIUM—See "Contracts Awarded."

N. J., Huntsville—SWIMMING POOL—See "Contracts Awarded."

N. J., Paterson — PARK — See "Contracts Awarded."

N. J., Prospect Park—SWIMMING and WADING POOL—See "Contracts Awarded."

N. Y., New York—COMFORT STATION—See "Contracts Awarded."

N. Y., Troy — RAILROAD — See "Contracts Awarded."

Pa., Emporium—AIRPORT—See "Contracts Awarded."

†*Federal Government*

Unclassified (Continued)

Pa., **Erie**—GOLF COURSE—See "Contracts Awarded."

Pa., **Hershey**—ICE PALACE—See "Contracts Awarded."

Pa., **Normalville** — CAMP—See "Contracts Awarded."

†Pa., **Phila.** — AUTOMATIC COMBUSTION CONTROL—Feb. 26, by Yards & Docks, Navy Dpt., Wash., D. C., automatic combustion control system and stoker motors for 12 boilers at Navy Yard, Spec. 8147.

†**Tenn., Knoxville**—AIR CONDITIONING SYSTEM—Feb. 25, by Tennessee Valley Authority, Knoxville, furnishing, installing air conditioning system at Norris Dam. C. H. Garity, dir. Purchases.

†**T. H., Pearl Harbor**—QUAY WALL—Mar. 25, by Yards & Docks, Navy Dpt., Wash., D. C., constructing extension to quay wall, Spec. 8014. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

CONTRACTS AWARDED

Ark., Fort Smith — STADIUM, etc. — Fort Smith Special School Dist., J. C. Gibson, bus. mgr., 300 ft., rein.-con., brick stadium, to Manhattan Constr. Co., Muskogee, Okla., $82,240; plumbing and heating stadium and reconditioning plumbing and heating equipment in several old buildings, to G. W. Shirley & Son, Van Buren, $30,145. **P.W.A.**

Calif., Bakersfield—HANGAR, etc.—Kern Co., constructing steel frame structure requiring between 150 and 200 tons structural steel, for 132x300 ft. hangar and shop, W.P.A. forces, $100,000. Work started. Noted Dec. 3, C. D. —Dec. 5, E. N.-R.

★ **Calif., Los Angeles** — PARK IMPROVEMENT—Bd. Supervs, Los Angeles Co., developing park, involving, clearing ground, salvaging existing structures and equipment, grading 185 acres, constructing swimming pool, tennis courts, comfort stations and picnic facilities, paving roads and planting lawns and shrubs, W.P.A. relief labor. $500,000. A. Jones, Hall of Records Bldg., engr. Noted Dec. 3, C. D.—Dec. 5, E. N.-R.

Conn., Norwalk—PLAYGROUND—City, Bd. Educ., constructing playgrounds and facilities, rear of Jefferson St. School, W.P.A. labor under supervision of P. Wks. Dpt., $23,287. P. James, City Hall, engr.

Ga., St. Simons Island — AUDITORIUM and PIER—City, M. B. McKinnon, clk., St. Simons Island, constructing 1 story auditorium and pier, brick walls, etc., to Artley Constr. Co., Savannah, $65,800. Est. $75,000. **P.W.A.** Bids Jan. 15, awarded Jan. 29. Noted Jan. 10, C. D.

Illinois, Iowa and Nebraska—RAILROAD—See "Materials and Equipment, under Chicago, Ill."

Ill., Carbondale—STADIUM—Southern Illinois Teachers College, rein.-con. stadium, incl. locker rooms, storage and press booth, relief forces. $77,924 allocated by **W.P.A.** Total $93,294. Private plans.

†**Mass., Boston** — REPAIRING PIER — Con. Q.M., Quartermaster Depot, repairing steel substructure for pier and anchor to ledge near northeast corner of pier at Army Supply Base, to Blakeslee-Rollins Corp., 79 Cambridge St., $8,900. Bids Feb. 3, awarded Feb. 4.

Mass, Framingham — ATHLETIC FIELD — Town, J. J. Brady, chn. Bd. Selectmen, Town Hall, constructing 2 rein.-con. stands, 234 ft. long and 40 ft. deep at Union Ave. athletic field, day labor under **W.P.A.** Total $34,835.. Town contribution $10,655, Federal allotment $24,180.

Mass., Lynn—STADIUM—City, J. F. Manning, City Hall, constructing stadium, Maple St. and Western Ave., semi-bowl type, concrete stands, etc., day labor under **W.P.A.** Est. $150,000. J. Morrisey, supt. Park. Noted Feb. 5, 1935, C. D.—Sept. 7, 1935, E. N.-R.

Miss., Cleveland—SWIMMING POOL—Delta State Teachers College, J. Sigler, engr., Cleveland, 140x52 ft. swimming pool, incl. dressing rooms, diving boards, fence, filtering plant, to cost $5,000 and lighting system, spectator seats, relief labor. Total est. $25,000. **W.P.A.**

Miss., Pascagoula—AIR FIELD—Bd. Supervs. Jackson Co., improving air field, installing modern lighting system, constructing concrete runways and 80x100 ft. hangar, relief labor. $35,000. L. C. Winterton, Pascagoula, engr.

N. J., Bayonne — PIER — City, constructing pier, to Preston Contg. Co., 30 Church St., New York, $211,405. **P.W.A.** Noted Dec. 11, C. D. —Dec. 19, E. N.-R.

N. J., Collingswood—STADIUM—Bd. Educ., Town Hall, constructing 2 additions to present concrete stadium on athletic field adjoining Collingswood High School, relief labor. $41,201. **W.P.A.** R. G. Haaf, Broadway and Royden St., Trenton, W.P.A. engr.

N. J., Huntsville—SWIMMING POOL—State, Quartermaster General, State House, Trenton, constructing swimming pool and repairing buildings at 114th Infantry Armory, relief labor, $25,166. **W.P.A.** N. J. Burke, 300 East 18th St., Paterson, W.P.A. engr.

N. J., Paterson—PARK—Passaic Co., Court House, general development of county park, relief labor. $113,796. **W.P.A.** N. J. Burke, 300 East 18th St., W.P.A. engr.

N. J., Prospect Park—SWIMMING and WADING POOL — Town, Town Hall, constructing swimming and wading pool, relief labor. **W.P.A.** N. J. Burke, 300 East 18th St., Paterson, W.P.A. engr.

New Mexico and Texas—PIPE LINE—Shell Pipe Line Co., McCamey, Tex., constructing 41 mi. pipe line from Hobbs, N. M., to Hendricks, Tex., separate contracts now being awarded. To exceed $100,000.

N. Y., Brooklyn—ELEVATED STRUCTURE—Bd. Transportation, 250 Hudson St., New York, altering elevated railroad structure at Myrtle Ave. and Fulton St., to Stock Constr. Co., Grand Central Terminal, New York, $46,000. **P.W.A.** Bids Nov. 15. Noted Nov. 18, C. D.—Nov. 7, E. N.-R.

N. Y., New York—COMFORT STATION—Dpt. Parks, Arsenal Bldg., Central Park, constructing comfort station and park buildings, Fort Schuyler Park, relief labor. To exceed $39,000. Owner purchasing material. A. Embury, 2nd, c/o owner, archt.

N. Y., Syracuse—SIGNAL EQUIPMENT, etc. —New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., switching and signal equipment at Syracuse Passenger Station, to General Railway Signal Co., 230 Park Ave., New York. Est. exceeds $25,000. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

N. Y., Troy—RAILROAD—City, City Hall, constructing 3,400 ft. railroad tracks to connect Boston & Maine tracks with New York Central tracks to run over Adams St., relief labor. **W.P.A.** $117,527. C. F. Crowley, city engr.

Okla., Oklahoma City—PIPE LINE—Devon Oil Co., Ramsey Tower, 9,880 lin.ft. 6 in. oil pipe line from 4th and Missouri to 23rd and Kelley Sts., to T. and P. Constr. Co., Ramsey Tower, Oklahoma City. $28,800. Est. $29,000. Awarded Jan. 27. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

Pa., Emporium — AIRPORT — Borough, improving Keystone airport, incl. 2 new hangars, 2 hard surfaced runways and field aprons, relief labor under supervision of J. Smith, engr. Est. $105,000.

Pa., Erie—GOLF COURSE—City, C. K. Pulling, deputy city engr., City Hall, in charge, general improvement of municipal golf course, incl. grading, etc., day labor under supervision of above engineer. **W.P.A.** project approved.

Pa., Hershey — ICE PALACE — Hershey Estates, c/o Hershey Lumber Co., constructing ice palace, 7,000 persons seating capacity, 1 story, 220x340 ft., about 100 ft. high, day labor. To exceed $50,000. Private plans. Owner purchases materials.

Pa., Normalville—CAMP—City of Connellsville, reconstructing Connellsville's boy scout camp, in Springfied Twp., near here, incl. 2,650 ft. roadway, 100 ft. dam, across Indian Creek, erecting wooden bridge, stone cistern, clearing 30 acres underbrush, constructing baseball, tennis and volley ball courts, laying 400 ft. red dog walks, and constructing stone chimney in mess hall, relief labor under supervision of City Engineering Dpt., $26,381. **Maturity at once.**

Texas—PIPE LINE—American Liberty Pipe Line Co., c/o D. S. Golding, 1st Natl. Bank Bldg., Dallas, constructing 115 mi. 8 in. welded oil pipe line from Rusk to Conroe, to Friddell Constr. Co., Rusk, approximately $140,000; furnishing 6,000 tons 8 in. steel pipe, to National Supply Co., Clark Bldg., Pittsburgh, Pa. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

†**Va., Portsmouth** — REWINDING TRANSFORMERS—Yards & Docks, Navy Dpt., Wash., D. C., rewinding electric power transformers, Spec. 8153, to Central Armature Wks., Inc., 625 D St., Wash., D. C., $3,270 (60 days).

MATERIALS AND EQUIPMENT

PROPOSED WORK

†STONE SPALLS—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., rejected bids Jan. 16, 6,000 cu.yd. stone spalls, Spec. 382. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

PUMPER FIRE ENGINES—**Pueblo, Colo.**—City Council, G. W. Clark, clk., G. Stumpf, comr. Safety, soon takes bids two 600 gal. pumper fire engines, probably of 12 cylinder V-type. $14,000.

FIRE EQUIPMENT—**Hartford, Conn.**—City Bd. Finance, Hartford, plans purchasing motorized fire units and hose. Budget provides $10,000 and $5,000 respectively for same.

NON-CONDUCTING COVERING—**Chicago, Ill.** —Dpt. P. Wks., City Hall, rejected bids Jan. 15, constructing non-conducting covering for cold water pipes, steam and hot water pipes, boilers, etc. Will readvertise. Noted Jan. 24, C. D.

TANKS—**Everett, Mass.**—Clinton E. Hobbs Co., 203 Chelsea St., applied for permit to install steel tanks, pipe lines, etc., for oil storage. Private plans.

DRIVES, DRIERS, etc.—**Holyoke, Mass.**—American Writing Paper, Inc., W. Russell, purch. agt., plans purchasing new drives $30,000, driers $40,000, screens $10,000, smoothing press $9,000, ragwasher $6,000, for Linden plant; waterwheel $25,000, new agitators

†*Federal Government.*

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BROWNING SHOVELS

Materials, etc. (Continued)

$4,000, suction rolls $6,000, for Nonotuck plant; power equipment $10,000 for Porter Parson plant.

TANKS — St. Louis, Mo. — E. W. Handlon, 3645 Olive St., granted permit to install two 550 gal. underground steel tanks for service station, 3645 Olive St.

TANKS—St. Louis, Mo.—L. A. Hernreich, 6001 Fyler Ave., applied for permit to install three 1,000 gal. underground steel tanks for gasoline at 6001 Fyler Ave.

TANKS—St. Louis, Mo.—O. A. Morhaus, 3517 Natural Bridge Ave., granted permit to install three 1,000 gal. underground steel tanks for service station, 3717 Natural Bridge Ave.

STEEL TANKS—St. Louis, Mo.—Dora Peerline, 2201 North Market St., granted permit to install three 1,000 gal. underground steel tanks for gasoline for use in service station, 2201 North Market St.

TANK—St. Louis, Mo.—T. E. Powe Lumber Co., 24 Branch St., granted permit to install one 1,000 gal. underground steel tank for 24 Branch St.

TANKS — St. Louis, Mo. — Rose Wantuck, Chippewa St. and Macklind Ave., granted permit to install three 1,000 gal. underground steel tanks for gasoline at auto service station, Chippewa St. and Macklind Ave.

STORAGE TANKS, etc.—Corona, N. Y.—R. Breen & J. Robbins, 143-36 Sanford Ave., Flushing, plans purchasing gasoline storage tanks, pumps and garage equipment, at Willetts Point and Northern Blvds. S. M. Palmer, 159-15 Northern Blvd., Flushing, archt.

TANKS, etc.—Corona, N. Y.—Daire Corp., Chatham Phoenix Bldg., Long Island City, plans purchasing underground gasoline storage tanks, pumps and garage equipment for 1 story garage, Northern and Willets Point Blvds. S. M. Palm, 159-15 Northern Blvd., Flushing, archt.

SNOW PLOW—Fulton, N. Y.—City, V. C. Lewis, mayor, plans purchasing motor driven snow plow. To exceed $1,000.

COPPER SULPHATE—Jamestown, N. Y.—Chautauqua Lake Assn., D. W. Buckmaster, pres., Chamber of Commerce Bldg., 30-50 tons copper sulphate for treating marine growth in Chautauqua Lake.

TANKS—New York, N. Y.—C. W. Sanders & F. Wolfe, 1812 Colden Ave., plan purchasing 500 and 1,000 gal. gasoline tanks, pumps, etc. for garage and service station, 155th St. and Morris Ave. A. M. Bates, 2526 Webster Ave., archt.

STEEL PIPE — Wellsville, N. Y. — G. H. Schrack, c/o Tavern, Wellsville, plans purchasing 4,000 to 4,500 ft. 6¼ in. steel pipe for gas well. $5,000 or more.

STEEL TANKS, etc.—Phila., Pa.—United Petroleum Corp., Hardt Bldg., plans installing 550 gal. steel tanks, electric pump, air compressor, etc., at gasoline service station to be built at 15th St. and Hunting Park Ave. To exceed $1,000.

†**MANHOLE RINGS and COVERS, etc.—San Antonio, Tex.**—Procurement Office Treas. Dpt. Smith-Young Tower Bldg., San Antonio, soon takes bids 22 manhole rings and covers, 18 special type manholes; 76 manhole steps; several thousand common brick; window glass; wooden windows, doors; 7 in. I-beams; steel angles; dynamite; kegs of nails; 500,000 ft. lumber; steel sash; hand tools for earthwork; clearing, grubbing wrenches, diggers; reinforcing steel; sand; cement; cedar posts; structural steel; heavy treated timber piling; corrugated iron metal pipe; hinges, finishing hardware; 2 8-in. steel and galvanized water pipe; vitr. and concrete sewer pipe; paints, oils, etc.

SNOW REMOVAL EQUIPMENT—Milwaukee, Wis.—City plans purchasing snow removal equipment. $50,000.

FIRE TRUCK—Eastview, Ont.—Town, J. B. Charette, mayor, will purchase new fire truck equipped with motor water pump, 950 ft. hose, etc. $8,000-$10,000.

BIDS ASKED

VACUUM VALVES, etc.—Los Angeles, Calif., Feb. 21, by D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., 22 each 8 in. vacuum valves and 6 each 1 in. air release valves, Spec. 1873. To exceed $2,000.

CAST IRON BELL, etc.—Fall River, Mass.—Feb. 18, by City, City Auditor, City Hall, furnishing c.i. bell and spigot centrifugal pipe, hydrants, hub end gate valves, hub end globe fittings, sleeves and bonnets, leadite, yarn, dynamite and exploders, lumber for Water Dpt.; Feb. 19, for earthen sewer pipe and fittings, sewer brick, Portland cement, sand and gravel, crushed stone and trap rock, lumber for P. Wks. Dpt.

MOTOR PATROLS—Faribault, Minn.—Mar. 10, by A. W. Luecke, aud., Rice Co., 1 or more motor patrols. C. E. Stahl, co. hy. engr.

†**PUMPING UNIT — Vicksburg, Miss.** — Feb. 26, by U. S. Eng., P. O. Box 665, Vicksburg, new centrifugal pumping unit, 7,250 g.p.m. with direct connected electrically driven motor.

TANK—Brooklyn, N. Y.—Meyer Randolph, 714 Bedford Ave., in market 3 or more 1,000 gal. gasoline tanks, pumps, etc., for 1 story, brick, service station, Lynch St. and Bedford Ave. Scacchetti & Siegel, 1860 Bway., New York, archts.

STEAM ROAD CINDERS—New York, N. Y.—Feb. 17, by R. Forbes, comr. Purchase, Municipal Bldg., furnishing, delivering bituminous steam road cinders to office of Queens Boro President.

WROUGHT IRON, etc.—New York, N. Y.—Feb. 18, by R. Forbes, comr. Purchase, Municipal Bldg., furnishing, delivering wrought iron and steel pipe and steel sheets to Dpt. Purchase.

ROAD OIL—Cincinnati, O.—Feb. 19, by C. E. Lex, city purch. agt., furnishing road oil to Dpt. P. Wks., Div. Hys. To exceed $1,000.

FLOODLIGHTING EQUIPMENT—Johnstown, Pa.—Feb. 18, by F. I. Connor, dir. Accounts & Finance, City Hall, floodlighting equipment for Point Stadium, incl. thirty 1,500 watt floodlights. To exceed $1,000. H. Lee Wilson, city engr.

LUMBER, etc.—Old Forge, Pa.—Feb. 21, by Old Forge School Dist., N. Yacopchak, secy., 117½ Church St., furnishing lumber and other building materials and paints for WPA projects at Central School and Sussex St. School. To exceed $1,000. Hancock & Wilson, Mears Bldg., Scranton, engrs.

COAL MINING DEVELOPMENT MACHINERY—Peckville, Pa.—A. Marsili, 1009 South Pleasant Ave., in market for machinery, transmission, conveying equipment, etc., for coal mining development on Dolph Tract, near Jessup.

†**SUCTION LINE and PUMP—Charleston, S. C.**—Feb. 20, by U. S. Eng., Customhouse, installing 14½ in. suction line and pump for U. S. Dredge Col. G. P. Howell.

†**COMMUNICATION and SIGNALING EQUIPMENT—Knoxville, Tenn.**—Feb. 21, by Tennessee Valley Authority, Knoxville, furnishing, delivering communication and signalling equipment for Norris and Wheeler Dams and Power Plants. C. H. Garity, dir. Purchases.

†**VENTILATING EQUIPMENT, etc.—Knoxville, Tenn.** — Feb. 19, by Tennessee Valley Authority, Knoxville, furnishing, delivering ventilating and air conditioning equipment for Norris Power Plant. G. H. Garity, dir. Purchases.

TRACTOR — Fredericton, N. B. — Provincial Dpt. Hys. in market for tractor. Est. about $15,000.

TRANSFORMER—Port Dover, Ont.—Culverhouse Canning Co. Ltd., in market for transformer. $1,400.

WEIGH SCALES—Sault Ste. Marie, Ont.—Harold Tolley, city clk., interested in prices for weigh scales suitable for heavy loads.

CONTRACTS AWARDED

CABLE—Los Angeles, Calif.—D. P. Nicklin, purch. agt., Dpt. Water & Power, 5,000 ft. No. 2 AWG rubber-insulated cable, Spec. 1870, to General Electric Co., 5201 Santa Fe Ave., $3,620. Bids Jan. 24, awarded Jan. 30. Noted Jan. 30, C. D.

OUTDOOR TYPE CAPACITATORS, etc. — Los Angeles, Calif. — D. P. Nicklin, purch. agt. Dpt. Water & Power, South Broadway, furnishing 6 outdoor type capacitators, potential devices and 2 potential devices only, protective relaying equipment for 3 sections of double circuit transmission line and 10 motor generator sets to be furnished in groups of 2 sets each, with auto control equipment as follows: 1,000 Watts continuous output, 3,000 watts same, 5,000 watts same, with voltage regulator and auto control to one AC bus, 5,000 watts continuous output with voltage regulator and auto control to 2 AC buses, to General Electric Co., 5201 Santa Fe Ave., and 1 River Rd., Schenectady, N. Y., $129,968; carrier current automatic supervision control equipment and power line carrier telephone equipment, to Westinghouse Electric & Mfg. Co., 420 South San Pedro St., $145,944, all foregoing under Spec. 1686. Bids July 11, awarded Jan. 28.

PLUG FUSES—Los Angeles, Calif.—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Broadway, furnishing plug fuses in such quantities as may be required during 1 year beginning Feb. 26, Spec. 1863, to Great West Electric Co., 1133 South Los Angeles St., $5,058. Bids Jan. 23, awarded Jan. 30. Noted Jan. 29, C. D.

SAND, ROCK, etc.—Modesto, Calif.—Directors Modesto Irrigation Dist., C. S. Abbott, secy., furnishing, delivering 1,820 cu.yd. sand and 1,200 cu.yd. rock for use at 19 locations along canals and laterals of district, to Hammott Rock Co., Modesto, $3,635. Bids Jan. 20, awarded Jan. 27. Rejected bids Jan. 20, furnishing 3,020 bbl. cement in paper bags, delivered f.o.b. warehouse, Woodland Ave. Yard. Noted Jan. 30, C. D.

CABLE, etc.—Chicago, Ill.—City, City Hall, furnishing 25,200 lin.ft. rubber insulated lead covered feeder cable, 4 conductor, to American Steel & Wire Co., 208 South LaSalle St., $5,947; 8 conductor, to General Cable Corp., 230 Clark St., $7,526; and 12 conductor, to Simplex Wire & Cable Co., 564 West Monro St., Chicago, $6,093***2,500 tons sand, by truck, to Material Service Corp., 33 North LaSalle St., $2,450***500 tons, by rail, to Garden City Sand & Fuel Co., 2408 South Throop St., $400. Grand total $22,416. Awarded Feb. 3.

★**STEEL RAILS—Chicago, Ill.**—Chicago & Northwestern R.R. Co., C. T. Dike, engr., 400 West Madison Ave., 35,000 tons rails, to Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa., about $1,500,000, to be laid by day labor and separate contracts in Illinois, Iowa and Nebraska.

VALVES, etc.—Chicago, Ill.—City, City [illegible] furnishing, delivering valves and tapping connections for Bureau of Engineering for [illegible] ending Dec. 31, 1936, to Michigan Valve & Fdry. Co., 1 North LaSalle St., $10,140. Awarded Jan. 31.

LUMBER, etc. — Muscatine, Ia. — Muscatine Co., K. Coder, aud., 36,131 ft. BM creosoted bridge lumber; 9,900 ft. BM Class A untreated bridge lumber, 38,400 ft. BM Class D untreated bridge lumber; 5,172 lin.ft. treated piling, to Nebraska Bridge Supply & Lumber Co., 730 Union State Bank Bldg., Omaha, Neb., $6,[illegible]. Bids Jan. 30, awarded Jan. 30. Noted Jan. 27, C. D.

LUMBER, etc.—Onawa, Ia.—Monona Co., 65,322 ft. BM Class A fire bridge lumber, 168,420 lin.ft. BM Class D fire lumber; [illegible] ft. treated yellow pine piling, to Nebraska Bridge, Lumber & Supply Co., 730 Union State Bank Bldg., Omaha, Neb. $10,932. Bids Jan. 27.

BRIDGE LUMBER — Sidney, Ia. — Fremont Co., 61,800 ft. BM Class D fire bridge lumber, 30,037 ft. BM Class A fire bridge lumber; [illegible] lin.ft. creosoted yellow pine piling, to National Bridge Material Co., 713 Union State Bank Bldg., Omaha, Neb., $4,121. Awarded Jan. 27.

PIPE, etc.—Morgan City, La.—City, [illegible] lin.ft. 12 in. concrete pipe and 5,500 lin.ft. 18 in. concrete pipe, f.o.b. Morgan City, to Concrete Products Co., 814 Howard St., New Orleans, at 45c. and 85c. per ft. respectively; 4,000 ft. No. 2 common form lumber, to G. Songe & Son Co., Morgan City, $32 per [illegible]

PORTLAND CEMENT, etc.—Beverly, Mass.—City, Comn. of Public Service & Aid, City Hall, 6,000 bbl. portland cement, to Portland Stone Ware Co., 80 Federal St., Boston, $2.21 per bbl.; 300 tons washed sand, to N. Tanzella, Lee St., Beverly, 85c. per ton. Bids Jan. 21, awarded Jan. 29.

†**HOISTWAY GATES—Boston, Mass.**—Public Works Officer, Navy Dpt., Boston, furnishing, installing elevator doors and equipment in Building 149, Boston Navy Yard, to A. B. C. Elevator Co., Inc., 164 Stuart St., $3,312. Bids Jan. 21. Noted Jan. 29, C. D.

†**SUCTION ELBOW, etc.—Fort Peck, Mont.**—U. S. Eng., Kansas City, Mo., 1 suction and 2 discharge elbows to be cast steel, for Fort Peck Dam, to Maynard Electric Steel Casting Co., 2856 South 27th St., Milwaukee, Wis., $1,749. Est. $2,200. Bids Jan. 29, awarded Jan. 30.

†**PIPE—Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., furnishing fabricated pipe and fittings for Boulder Dam Power House, to Standard Sanitary Mfg. Co., 1730 Blake St., Denver, Colo., $7,585. Bids Dec. 9.

†**PIPE FITTINGS, etc.—Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., pipe and fittings for Boulder Dam Power House, to General Co. of Pacific, 520 Mateo St., Los Angeles, Calif., $1,345; valves to Crane-O'Fallin Co., 1631 15th St., Denver, Colo., $3,424. Bids Nov. 29. Noted Nov. 14, C. D.—Nov. 21, E. N.-R.

NAILS, TRAILER, etc.—Raleigh, N. C.—Div. Purchase & Contr., A. S. Brower, dir., 500 kegs nails, spike and staples and 675 kegs common wire nails and staples to Brown Rogers-Dixson Co., Winston Salem, $1,590 and $1,949 respectively***one semi-trailer with body, to Corbitt Co., Henderson, $1,233***15 dozen liquid spray guns, solid brass, and 1 self-dump hay rake, 8 ft. wide, to Jos. P. Wyatt & Son Co., 325 South Wilmington St., Raleigh, $184 and $37 respectively***500 kegs common wire nails, 60D and 20D, to Steel Union-Sheet Piling Co., 75 West St., New York, $1,400***1,000 road machine blades 6 ft. x ¼ in. x 6 in., and 700 road machine blades 7 ft. x ¼ in. x 6 in., to Continental Gin Co., 4600 4th Ave. S., Birmingham, Ala., $1,928 and $1,551 respectively*** 1,200 drag blades 8 ft. x ¼ in. x 6 in. and 325 twenty ft. lengths miscellaneous steel, to Dillon Supply Co., 216 South West St., $2,160 and $727 respectively. Grand total $12,750. Bids Jan. 30. Noted Jan. 16, 24 and 28, C. D.—Jan. 23, E. N.-R.

LUMBER—Cincinnati, O.—City, furnishing to Dpt. P. Wks. heavy timbers, to H. Riemeyer Lumber Co., 1460 Gest St. $1,396***yellow pine lumber, to Johnson-Doppler Lumber Co., Llewelyn and Frick Rds. $2,781***mixed hardwood lumber, to Mowbray Robinson Co., 1400 West 8th St. $467. Grand total $4,644. Noted Dec. 27, C. D.

PIG LEAD—Cincinnati, O.—City, furnishing to Dpt. Water, 32,000 lb. pig lead, to J. H. Homan Metal Co., 824 Reedy St., $1,488. Noted Jan. 9, C. D.

STEEL, etc.—Cincinnati, O.—City, furnishing 14,000 lb. gutter broom spring steel and 12,000 lb. of bass broom fiber, to A. Steiert & Sons, Cincinnati, $2,968. Bids Dec. 18, awarded Jan. 31. Noted Dec. 12, C.D.

STEEL TANKS—Altoona, Pa.—Pennzoil Co., Oil City, installing 550 gal. steel tanks, electric pump, air compressor, etc., in service station to be built at 921-923 Green Ave., to Moyer Bros., Altoona. Est. exceeds $1,000.

†*Federal Government*

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Materials etc. (Continued)

†LUMBER—**Ashland, Wis.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., reinforcing steel and bolts, nuts, washers, to Northern Supply & Fuel Co., Superior, $282 and $219 respectively***56 items lumber Group 1, and hand rails, flashing, brick, shingles, flue linings, casing, asphalt felt, Group 2, to Prive Lumber Co., Park Falls, $616 and $427 respectively*** nails, cleanout door, ash trap, etc., Group 3, to E. Gotzsch & Sons Hardware Co., Ashland, $209 ***millwork, Group 4, to Union Sash & Door Co., Superior, $462***paint, Group 5, to Knudsen Bros., Inc., 1620 North 12th St., Milwaukee, $93. Grand total $2,308. Bids Jan. 21.

BOILER and UNDERFEED STOKERS—**Manitowoc, Wis.**—Public Utilities Comn., furnishing 1,200 hp. W.S.P. water tube boiler, to Wickes Boiler Co., Saginaw, Mich., $29,082; stoker, to Riley Stoker Corp., Worcester, Mass., $23,967. Bids Jan. 23. Noted Jan. 20, C.D.

†HYDRAULIC PRESS, etc.—**Milwaukee, Wis.**—U. S. Forest Service, Milwaukee, hydraulic press, to Andrae Auto Supply Co., 1114 North Water St., $208***boring bar, to Lempco Products Co., Bedford, O., $257***50 mi. copper covered wire, to General Cable Co., 20 North Wacker Dr., Chicago, Ill., $833***paint, to Certainteed Products Co., 735 North Water St., $904. Grand total $2,202. Awarded Jan. 29.

FOREIGN

Africa, Southern Rhodesia, Salisbury—Director of Public Works, P. O. Box 365, receiving competitive plans for parliament building. J. R. Adamion, assessor.

China — Chekiang-Kiangsi Railway, **Hunan,** has received approval from Ministry of Railroads for constructing new line from Nanchang to Liling, $16,000,000***Yunnan Ministry of Communications to develop telephone system in Provinces of Szechwan, Yunnan, Kweichow, Shansi and Katnisu, $10,000,000***Kwangsi Provincal Government preparing plans constructing electric power plant in Fuchuan, Hobsein and Chungshan, $7,000,000; Provincial Department of Reconstruction, **Chekiang,** prepares plans reclamation project, Sanmenwan Bay, $500,000.

England—Beck, Keller & Co., Ltd., **Liverpool,** preparing plans factory and office, on Edwards Lane, $600,000***Wimperis, Simpson, Gutherie, archts., South Molton St. West, **London,** preparing plans factory and store building on Princes Rd., $550,000***Fuller, Hall & Foulsham, archts., 212 High Holborn W.C., constructing warehouse on Hydons St., **London,** to Miskin & Son, Ltd., Romeland, St. Albans, $800,000***Wallish, Gilbert & Partners, archts., Coastal Chambers, Buckingham Palace Rd., **London,** preparing plans factory, store and office building for Richard Klinger, Ltd., 120 Southwark St., $700,000***Almalaged Studios Ltd., **London,** studio construction at Elstree, to Sir Robert MacAlpine & Sons, Ltd., 50 Pall Mall St., $2,500,000, E. A. Stone & Partners, 20 Berkeley Square West, archts.***Modern Studios Constr. Co., Grand Bldg., Trafalgar Square S.W., **London,** prepares plans film studios, $1,250,000 ***Champion Sparking Plug Co., Ltd., 83 Pall Mall S.W., **London,** preparing plans factory at Hatton Cross, $500,000***A. D. MacIntosh & Co., Ltd., Mount St. West, **London,** prepares plans 275 houses at Huddlesden, $550,000*** Westons Hospital Governors, **London,** plans by Adams, Holden & Pearson, archts., 9 Knightsbridge St. S.W., for hospital addition, $3,750,000 available***A. W. Hall, archt., 17 Southampton St., **London,** preparing plans hospital addition for Middlesex Hospital, $500,000***Kohn Laing & Son, Ltd., North Mill N.W., **London,** prepares plans 770 houses at Watford Way, $1,540,000***Hillery Chaplin Ltd., 1 Russell Parade, Golders Green N.W., **London,** prepares plans 550 houses, $1,100,000.

England—A. Webb & Son, 19 Queen Anne Gate St., S.W., plans block of flats on Charles St., **London,** $710,000***P. A. Roffey, Martyn House Disraeli Rd., S.W., **London,** preparing plans 100 suite apartment building $800,000*** Port of London Authority, **London,** stores building at Surrey Commercial Docks, to Sir Robert McAlpin & Sons, 50 Pall Mall S.W., $495,000 ***W. E. Trent, archt., **London,** prepares plans theatre on Barking Rd. for Denman Cinemas Ltd. Gallery House, Regent St., **London,** $500,000***Verity & Beverly, archts., 7 Sackville St. W., constructing theatre and hotel, to B. B. Pearson, Ltd., Albert St., Birmingham, for Paramount Theatres Co., Ltd., $3,750,000***R. Cromie, 6 Cavendish Square, **London,** plans theatre, Embassy Cinema Ltd., Gardiner St. $465,000***Wallis Gilbert & Partners, archts., 15 Elizabeth St., S.W., **London,** preparing plans office building for Huntley & Palmer, Ltd., $1,250,000***Burton-on-Trent Town Council voted $300,000 for town hall additions***South Hertfordshire Water Co., **Hertford,** plans 1936 expansion $600,000.

England—Hackbridge Cable Co., Ltd., **Hackbridge,** prepares plans addition $860,000*** Copper, Pass & Son, Ltd. **Bristol,** prepares plans networks at Melton $1,000,000***Derby Town Council voted $2,843,000 for sewers and drainage scheme***Cheltenham Municipal Councils of Gloucester and Cheltenham voted for combined water-supply $1,000,000***John Bowes & Partners Ltd., **South Shields,** prepares plans coking plant on Mill Lane $1,250,000***Thomas Board Mills Ltd., **Warrington,** plans factory for cardboard and box manufacturing on 30 acre site $1,750,000***Baldwin Ltd., **Kidderminster,** prepares plans extending Stourville works $625,000***Harrison & Tracey, archts., County Chambers, Corporation St., **Beston,** plans constructing factory for Pegrex Tool & Mfg. Co., Ltd., 222 Lighfield Rd., Birmingham, $725,000***Morris Motors, Ltd., **Birmingham,** machinery and assembling shop, to E. L. Turner Co., Ltd., 204 Saint Vincent St., Ladywood, $1,250,000*** Clayton & Vlack, archts., 10 Prince Albert St., **Brighton,** prepare plans developing court close estate $1,500,000***Rustless Curtain Rod Co., **Clockheaton,** prepares plans plant addition $410,000***T. J. R. Meakin & Son, archts., 11 Warwick Rd., **Coventry,** prepares plans for Standard Motor Co., Ltd., $2,500,000***Swansea Municipality plans aerodrome on 266 acre site, recently purchased***Moss Bros. Aircraft Co. Ltd., **Chorley,** plans manufacturing and assembling plant, $600,000***Boznor Regis Municipality applies for powers to construct aerodrome, $500,000.

England, London—Ault & Wiborg, London, England, plans by Gunton & Gunton, London, constructing manufacturing plant addition, $500,000.

Finland, Oulu—Oven Osakeyhton, E. Kalaja, mgr., prepares plans sulphate cellulose mill of 100,000 tons annually.

India, Karachi—Municipality and Government plan constructing aerodrome. $650,000.

Irish Free State, Dublin—Municipality plans housing scheme. $5,000,000. City Architect, 3 Parliament St. City Manager, 1 Lord Edward St.

Japan—Kyushu Ministry of Communications, approved constructing water power station to generate 50,000 k.-w. incl. dam 260 ft. high for Kyushu Hydro-Electric Power Co.***Ocean Mining Co., Ltd., **Kyushu,** refining into ferro-nickel, nickel ores from French New Caledonia*** Hayayama Oil Co., of Tokyo, **Funakawa,** plans constructing crude oil refinery $600,000*** Showa Industry Co., Hioeo Ito, Mng. Dir. **Shiogama,** to construct plant to produce hardened oil superphosphatic acid and wheat flour $1,000,000 ***Rayon Co., **Tokyo,** in market for machinery for rayon mills***Rayon Co., **Fukushima** in market for machinery for 20 ton mill***Rayon Co., **Showa,** in market for machinery for 5 ton mill***Bemberg Rayon Co., **Asahi,** in market for machinery for 10 ton mill***Japan Carbide Industry Co., **Tokyo,** plans 15,000 metric tons capacity carbide per year plant, in addition to benzol and calcium cyanide***Mitsuma Bussan Kaisha, **Tokyo,** plans plant to manufacture rayon pulp from cotton waste***Kurashiki Rayon Co., **Tokyo,** in market for equipment for 20 ton mill under way***Teikoku Rayon Co., **Teikoku,** plans 20 ton mill***Ministry of Railways, **Tokyo,** includes in 1936 budget submarine tunnel, linking main island of Japan with North Kyushu and boring 3,335 meter tunnel between Komorie, Mogi and Teshimachi.

Jamaica, Kingston—May 4, by Crown Agents for Colonies, 4 Millbank S.W., London, England, dredging 200,000 cu.yd. approach channels at Kingston and Port Antonio. Specifications can be obtained from Director Public Wks., Jamaica at Drew Brown, Ltd., 530 Mountain St., Montreal, Canada.

Mexico, Piedras Negras—Mexico City Hotel Corp., A. G. Gonzales, Torreon, making preliminary plans constructing 7 story hotel and store, incl. swimming pools, playgrounds, golf course, etc. $450,000. Private plans.

Mexico, Piedras Negras—Federal Government, War Dpt., Mexico City, and A. G. Gonzales, ch. of Garrisons, Torreon, Mexico, preliminary surveys constructing modern troop garrison unit, incl. barracks, officers' quarters, utilities, mess halls, warehouses, etc.

Mexico, Progresso — Mexican Government, Ministry of Communication, Mexico City, soon lets contract wharf. To exceed $500,000.

New Zealand, Wellington—Apr. 21, by Secretary Public Works, Supplies & Tenders Committee, supplying 30,000 kva. transformer bank for Penrose Station (three 10,000 kva. immersed self-coiled single phase transformers with all accessories).

Northern Ireland, Belfast—E. Brown & Son, Ltd., 102 Donegal St., plans by J. E. Crindale, 83 Rougal Ave., developing housing scheme on Fort Wilham. Est. $1,000,000.

Norway, Larvik — Norwegian Government plans constructing 30,000 ton per annum stainless steel ingot plant.

Scotland—Abbey Craig Laundry Wks. Ltd., Causeway-head, prepares plans, building and equipment, **Stirling,** $500,000*** **Kincardine** County Council preparing plans reconstructing lower North Water Bridge, $400,000***Rothesay, J. B. Brodie, Glasgow, preparing plans constructing piers for harbor trust***Dunbarton Town Council soon takes bids 400 houses, $850,000***Levon Town Council votes 224 houses, $480,000***Dundee City Engineer ordered to submit plans for sewerage scheme, $575,000.

Scotland—J. R. Mackay, archt., 4 Melville St., **Edinburgh,** preparing plans reconstructing and extending plant for Thompson & Morris Mfg. Co., Ltd., Glasgow Rd., $750,000***A. L. Goodwin, archt., 34 Castle St., **Edinburgh,** preparing plans plant for James Cruickshanks Co., Ltd., Oven Bldg., 20 Duff St., $395,000***A. L. Goodman, archt., 34 Castle St., **Edinburgh,** prepares plans biscuit factory for Mitchellhills Co., Ltd., $610,000*** Edinburgh Housing Association Ltd., **Edinburgh,** plans 332 houses at Sighthill, $665,000*** R. Ewan, 39 Hope St., **Glasgow,** plans 5 story flour mills, $482,000***North British Rayon Co., **Tedburgh,** prepares plans plant on Murray Green, $1,250,000.

Scotland — Barrhead Borough Council votes constructing 300 houses, $540,000***Bisland Brothers Ltd., 75 Hyde Park St., **Glasgow,** plans 5 story building at bakeries, $425,000*** **Greenock** Burgh Council voted for constructing 508 houses on Kilmacolm Rd., $1,100,000*** P. A. Thomason, town slk., **Ayr,** open for prices on 18,000 ft. 18 in. lapwelded steel pipes, both lined and coated with bitumen, steel and c.i. specials, 8,710 ft. 8- to 15-in. pipe.

South Africa — Atkinson Oates Ltd., **Port Elizabeth,** prepares plans car assembling plant, $750,000***North American Cyanide Ltd. of Toronto, Canada, purchased site and plans cyanide manufacturing plant in **Port Elizabeth** ***Somerset West Municipality plans water supply, $500,000***Riverside Municipality plans water supply scheme.

South Africa, Pretoria—Government of South Africa, preparing plans constructing emergency landing stations 50 mi. intervals along air routes.

Union Socialist Soviet Republics — Government, Moscow, completed surveys and making preparations for constructing 900 kilometers railway from Verhneudinsk to Urga; 700 kilometers from Semipalatinsk to Zarsan; 400 kilometers from Sergiopoe to Chuguchak; 450 kilometers from Ilisk to Djarkentkulsga; and 2,000 kilometers from Sempilatinsk to Uliastai.

PUBLIC BUILDINGS

PROPOSED WORK

Ala., Mobile—See "Unclassified."

★ †**Ariz., Whipple**—U. S. Veterans Administration, Arlington Bldg., Wash., D. C., plans surgery building, clinics and remodeling existing buildings. $676,000.

Calif., Concord—L. Olson, Clayton, of committee appointed by citizens to investigate proposal to install gas mains and furnish gas for residents of Clayton and Concord. To exceed $100,000.

Calif., Los Angeles—Bd. Educ., Chamber of Commerce, plans by A. R. Hutchason, 1001 Architects Bldg., reconstruction, rehabilitation and strengthening of main building at Joseph Le Conte, Jr., High School, 1316 North Bronson Ave. $160,000. R. McC. Beanfield, 629 Chamber of Commerce Bldg., engr.

Calif., Patton—State plans by G. B. McDougall, state archt., P. Wks. Bldg., Sacramento, Class "A" rein.-con. additional hospital units. To exceed $150,000.

Calif., South Gate—Los Angeles Bd. Educ., Chamber of Commerce Bldg., plans by G. S. Underwood, 1400 Continental Bldg., Los Angeles, classroom building and auditorium building at South Gate High School, 3351 Firestone Blvd. $151,000. H. M. Rootham, 1400 Continental Bldg., Los Angeles, structural engr. E. L. Ellingwood, H. W. Hellman Bldg., Los Angeles, mechanical engr. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Conn., Danbury—City, H. F. Down, supt. Schools, plans by P. N. Sunderland, 248 Main St., for junior high school and grade school in eastern part of city. Federal aid. $140,000 or more.

†**Conn., Glastonbury** — Treas. Dpt. at office Sup. Archt., Wash., D. C., bids in February, 1 story, 48x72 ft. post office, Hebron Ave. and Main St. $50,000. Noted Oct. 23, C. D.—Oct. 31, E. N.-R.

Conn., West Hartford (br. Hartford) — St. Thomas the Apostle Parish, J. F. Callahan, pastor, sketches by J. J. McMahon, 187 Barker St., Hartford, brick, stone parochial school. $145,000.

Ga., Atlanta—Bd. Comrs. Fulton Co., Court House, soon takes bids installing cell equipment in new cell block hospital, kitchen and laundry equipment. $184,000. P.W.A. loan approved. C. H. Hopson, Healey Bldg., engr. Noted Sept. 17, 1934, C. D.—Sept. 20, 1934, E. N.-R., under "Contracts Awarded."

★ **Ga., Augusta**—City plans hydro-electric plant and power lines for industrial section only. Est. $600,000. Burns & McDonnell Eng. Co., 106 West Linwood Blvd., Kansas City, Mo., engrs. Noted Aug. 2, 1934, C. D.—Aug. 9, 1934, E. N.-R.

†**Ill., Madison** — Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 1 story, basement, concrete, brick, stone U. S. Post Office. $65,000 appropriated.

†**Ill., Marseilles**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing 1 story, basement, concrete brick, stone U. S. Post Office. $67,000 appropriated.

†**Ill., Marshall**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 1 story, basement, brick, concrete, steel post office. $65,000 appropriated.

†**Ill., Mount Morris**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 1 story, basement, concrete, stone, brick U. S. Post Office. $73,000 appropriated.

Ind., Portland—City Council plans improving municipal light plant, incl. installing 3,000 kw. turbine, new condensers, reconstructing switchboard, installing ash conveyor, new underground lines in downtown district, enlarging plant. Applied for $179,000 P.W.A. funds. Bevington Williams, Inc., 1137 K. of P. Bldg., Indianapolis, engrs.

(Federal Government.

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Public Buildings (Continued)

†**Md., Belair**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Jan. 16, constructing U. S. Post Office. Will readvertise. Noted Jan. 21, C. D.—Dec. 26, E. N.-R.

Mass., Harwichport — Town, Bd. Selectmen, Town Hall, plans by Robb & Eldridge, 234 Clarendon St., Boston, Junior and Senior High School, brick, steel, concrete found. To exceed $140,000.

★ **Mass., Malden**—City, F. G. Marshall, supt. schools, City Hall, voted not to build Senior High School. $1,000,000. Desmond & Lord, 1 Beacon St., Boston, archts. Noted Sept. 30, C. D.—Oct. 3, E. N.-R.

★ **Minn., Bemidji**—City, election Feb. 18, to authorize construction municipal power plant, incl. central heating system, generating unit, distribution system. $620,000. Burlingame & Hitchcock, 521 Sexton Bldg., Minneapolis, engrs. Noted Jan. 20, 1935, C. D.—Jan. 31, E. N.-R.

Missouri—State Eleemosynary Bd. and State Building Comn., Bi-Partisan Advisory Bd., E. M. Eagan, executive secy., Jefferson City, soon takes bids fireproofing existing buildings at State Hospital, Fulton, $113,278; Hospital 3 at Nevada, $160,441; and at Hospital 2, St. Joseph, $77,400. W.P.A. project.

Mo., Jefferson City—Missouri State Penitentiary, Jefferson City, and State Building Commission, Bi-Partisan Advisory Bd., E. M. Eagan, executive secy., soon takes bids 3 story, basement administration building, 2 story, basement service building and 3 story, basement dormitory, rein.-con. brick, at Women's Prison, $300,000. P.W.A. project. Klipstein & Rathmann, 316 North 8th St., St. Louis, archts.

†**Mo., Marceline**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids brick, concrete, stone U. S. Post Office. $64,000 appropriated.

†**Mo., Monett** — Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing 1 story, basement, brick, concrete, stone post office. $70,000 appropriated.

†**Mo., St. Louis**—Treas. Dpt., Procurement Div., at office Medical Officer Marine Hospital, St. Louis, takes bids Feb. 13, for sale or donation of tract of land containing from 12 to 25 acres for marine hospital, in or near St. Louis.

†**N. M., Fort Bayard**—Vet. Bu., Arlington Bldg., Wash., D. C., plans constructing modern heating plant, large recreation building, improving roads, drives, etc., at U. S. Veterans Hospital. $200,000.

N. Y., Brooklyn—Dpt. Water Supply, Gas & Electricity, Municipal Bldg., New York, plans by J. Goodman, c/o owner, altering 3 story, brick, concrete repair and service building, 350 Flushing Ave. $250,000.

N. Y., Ithaca—City, City Hall, plans constructing municipal power plant. To exceed $105,000. H. W. Eustance, city engr.

N. Y., New York—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, 2nd, c/o owner, 2 story, 59x242 ft. granite recreation building, Reservoir Oval. $260,000.

N. Y, New York—College of City of New York, St. Nicholas Ave. and 141st St., plans by R. H. Bowden, 13 East 37th St., 3 story, 76x78 ft. library addition and improving other building, St. Nicholas Terrace and 141st St. Est. about $140,000.

N. Y., Oneida—City, Citizens Hospital Building Com. plans by Melvin and Harry King, Dennison Bldg., Syracuse, and takes bids early in spring constructing hospital. $220,000. P.W.A. project. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

†**N. Y., Springville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing U. S. Post Office, brick, stone, steel, plain found., Franklin St.

N. Y., Wyoming—Central School Dist., comprising towns of Attica, Middlebury, Covington, Warsaw and Perry, voted to consolidate districts and plan school. To exceed $140,000. A. C. Ewell, Wyoming, chn. Noted Nov. 6, C. D.—Nov. 14, E. N.-R.

†**N. C., Burlington**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office. $185,000. Site selected.

†**N. C., Clinton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office. $68,000. Site selected.

†**N. C., Henderson**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office, $132,000. Site selected. Noted Nov. 2, 1934, C. D.—Nov. 8, 1934, E. N.-R.

†**N. C., Marion**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office, $100,000. Site selected.

†**N. C., Mooresville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office. $68,000.

†**N. C., Roxboro**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office, $75,000. Site selected.

N. C., Sanatorium—North Carolina Sanatorium, Dr. P. P. McCain, supt., L. L. Gravely, Rocky Mt., chn. Bd., plans by E. G. Flannagan, Henderson, hospital. $173,000. $95,000 state funds available for constructing surgical wing but board will apply for P.W.A. funds to construct addition to colored section of hospital, will install elevator in negro section.

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†**O., Cincinnati**—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids about April, constructing U. S. Post Office and Federal Building.

★ **O., Cleveland**—Bd. Educ., McRae Parker, dir., plans by G. F. Burrows, East 6th St. and Rockwell Ave., 3 story, basement Charles Eliot Junior High School. $600,000.

S. C., Columbia — South Carolina State Hospital plans by Lafaye & Lafaye, 226 Sumter St., 2 story, brick psycopathic building, $275,000. Dr. C. Fred Williams, Columbia, supt.

†**S. C., Fort Moultrie**—Con. Q.M., Fort Moultrie, plans enclosing barracks' porches $16,625; repairing roads $16,908; 16 garages $5,363; repairing post electric system $466; repairing and adding bathrooms to 12 sets of officers' quarters $7,558; repairing rip rap seawall $24,652; drainage and grading $18,840; flooring barracks $15,584; painting interior and repairing post chapel $1,191; drainage and repairing sewerage system $4,392; filling 320 sq.yd. $3,432; 440 lin.ft. 2 in. sewer and repairing manholes $557. Grand total $115,568. $120,000 allotted by W.P.A.

★ **Tex., Houston** — **Texas Bd. Control, c/o** C. Teer, chn., plans San Jacinto memorial, 500 seating capacity auditorium, museum, library, colonaded court and open air amphitheater, with 32x112 ft. stage, San Jacinto Battlefield, $500,000. $250,000 P.W.A. grant allotted. A. C. Finn, Bankers Mortgage Bldg., archt.

Tex., Pecos—Reeves County, J. B. Wolfolk, judge, Pecos, soon takes bids 3 story, part basement, 76x120 ft., granite, limestone, rein.-con., steel court house and jail, plain found. $165,000. J. C. Becker, San Angelo, archt. Mathews & Kenan, Smith-Young Tower, San Antonio, engrs. Noted Feb. 11, C. D.—Feb. 14, E. N.-R.

Wash., Pullman—Washington State College, plans by S. Smith, Pullman, gymnasium, swimming pool and health building for women, $400,000. P.W.A. grant $180,000. (**Correction**—Status of project.) Noted Feb. 6, E. N.-R., under "Contracts Awarded."

Wis., Milwaukee—Milwaukee Downer College, 2512 East Hartford Ave., plans by Allen, Collens & Willis, 75 Newbury St., Boston, Mass., constructing library building, East Hartford, $250,000. Noted June 27, C. D.—July 4, E. N.-R.

†**Wyo., Cheyenne**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing 4th story addition to U. S. Post Office. $95,000.

Ont., Kemptville—F. W. Warren, archt., 66 King St. E., Hamilton, preparing plans for new high school, replacing building destroyed by fire, for Bd. Educ. Interested in prices of everything, incl. chemistry and physics equipment. Tenders will be called about Mar. 1. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Ont., Oshawa—Oshawa General Hospital, 24 Alma St., A. Storrie, chn., soon takes bids constructing new wing to hospital, Alma St. Est. about $150,000.

Ont., Whitby—Oshawa General Hospital making plans constructing children's wing to hospital. $150,000.

BIDS ASKED

Ala., Montgomery—Feb. 27, by City, at office of J. M. Garrett, city engr., superstructure for city hall, auditorium, jail and equipment. $475,000 funds available. Frank Lockwood, Inc., 121 Adams St., archt. Noted Dec. 13, C. D.

D. C., Wash.—Feb. 18, by District Comrs., constructing Randall Junior High School, 1st and Eye Sts. S.W.

Ill., Chicago—Feb. 18, by Bd. Educ., 228 North LaSalle St., constructing masonry, fireproofing, steel lockers, composition roofing, sheet metal, structural steel and iron, miscellaneous steel and iron, carpentry, painting, glass and glazing, plastering, terrazzo, tile, marble, heating, plumbing and electrical work at elementary schools at North Oak Park and Foster Sts., at Hiawatha and Kilpatrick Sts., and at West 54th St. and South Oak Park***glass and glazing, Emmet Elementary School addition, 5500 West Madison St., and Kilmer School addition, 67 Greenview Ave. J. C. Christensen, 228 North LaSalle St., archt. P.W.A. project.

Ill., Chicago—Feb. 21, by Div. Architecture & Eng., Dpt. P. Wks., Springfield, laboratory equipment at Orthopedic Building, Research and Educational Hospitals, C. H. Hammond, supery. archt.

Ill., Elgin—Feb. 21, by Div. Architecture & Eng., Dpt. P. Wks. & Buildings, Springfield, plumbing, heating, electrical work and pipe covering work and elevators for Staff House and "C" type ward building at Elgin State Hospital, C. H. Hammond, supery. archt.

Ill., Manteno—Feb. 21, by Div. Architecture & Eng., Dpt. P. Wks. & Buildings, Springfield, plumbing, heating, electrical work, pipe covering, and elevators for mechanical stores building at Manteno State Hospital, C. H. Hammond, supery. archt.

†**Ill., Quincy**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., altering and constructing 3 story, brick, concrete, stone post office and court house addition. $215,000 appropriated. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Mass., Somerset—Feb. 17, by Town [illegible], Hanson, chn. Building Comn., at office [illegible] Treasurer, 2 story, basement, 60x220 [illegible] steel high school, County St. $182,000 [illegible] project. I. T. Almy, 56 North Main [illegible] River, archt.

Mich., Blissfield—Feb. 19, by Village Trustees, furnishing, erecting turbine gener[illegible] for municipal power plant, P.W.A. Docket [illegible] R. Contr. 1-A. Lenawee Co. Ayres, Lewis, Norris & May, Ann Arbor, engrs. Noted Jan. 20, C. D.

Mo., Jefferson City—See "Contracts Awarded."

N. M., Santa Fe—Feb. 21, by State H. G. Gerhart, secy., Capitol Addition Building Comn., general contract plumbing and heating, electrical work, fixed equipment, vault lining and door, and elevator for 3 story, 200x[illegible] ft. rein.-con. supreme court, plain found. Don Gaspar Ave. $283,000. G. F. Street, Santa Fe, archt. P.W.A. project. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

N. Y., Brooklyn—Feb. 26, by J. Rice, comr. Dpt. Hospitals, Municipal Bldg., New York, general contract, plumbing, heating, ventilating, electrical work and lighting fixtures for Red Hook-Gowanus Health Center, Baltic Co. P.W.A. project. Bids Nov. 7 rejected. Noted Dec. 16, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

N. Y., New York—Feb. 19, by S. S. Goldwater, comr. Dpt. Hospitals, Municipal Bldg., constructing plumbing, refrigerating and ice making plants, brine line system, altering structure adjoining machine shop and adjoining in City Home Dist., Welfare Island.

N. Y., Rockaway—Feb. 17, by Dpt. Hospitals, Municipal Bldg., New York, constructing heating, ventilating, refrigeration for new power plant, male dormitory and laundry and equipping and altering main building, Neponsit Beach Hospital, Rockaway Beach Blvd. and 149th St., Queens Boro, Contr. 3.

N. Y., Schoharie—Feb. 20, by Schoharie Co., general contract electrical work and jail equipment for county jail at rear of court house, P.W.A. project. A. Selkirk, 11 North Pearl St., Albany, archt. Excavation and foundations awarded to Lange-Finn Constr. Co., Inc., 196 Lark St., Albany.

†**N. C., Wilmington**—Feb. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling U. S. Post Office, Court House. Noted July 18, C. D.

†**N. C., Wilmington**—Mar. 5, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $335,000.

Pa., Franklin—Feb. 25, by Franklin School Dist., W. O. Phipps, pres., constructing new Junior High School and improvements to Senior High School. $293,182. P.W.A. project. Lawrie & Green, 3rd and Forster Sts., Harrisburg, archts. Noted Dec. 18, C. D.—Dec. 26, E. N.-R.

Tex., Austin—Feb. 24, by State Bd. Control, C. Teer, chn., reflooring corridors, rotunda, vestibules, etc., with terrazzo for the first floor of Texas State Capitol Building and separate sealed proposals for repairs to and repainting exterior of dome of State Texas Capitol. C. H. Page, Box 936, Austin, archt.

†**Tex., Dallas**—Feb. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing elevator plant in U. S. Parcel Post Building.

CONTRACTS AWARDED

Ark., Fort Smith—See "Unclassified."

Calif., Arbuckle—J. L. McLaughlin, general contractor, 251 Kearny St., San Francisco, electrical work for 1 story, high school, for Pierce Union High School Dist., to Lynch Electric Co., 2080 Sutter St., San Francisco; plumbing, heating and sheet metal, to M. R. Carpenter Co., 907 Front St., Sacramento. Noted Jan. 14, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Calif., Berkeley—K. E. Parker Co., general contractor, 135 South Park St., plumbing and heating for school addition, Rose St., to J. E. O'Mara, 2720 McAllister St., San Francisco, for Berkeley School Dist. **P.W.A.** Noted Jan. 30, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

Calif., Campbell—Trustees of Campbell High School Dist., general contract 1 story, rein.-con. high school, to Villadsen Bros., 1140 Winsor Ave., Piedmont, $51,500; plumbing and heating, to W. F. Serpa, 497 North 13th St., San Jose, $6,696. **P.W.A.** Bids Dec. 17. Noted Dec. 16, C. D.

Calif., Chico—Campbell Constr. Co., general contractors 800 R St., Sacramento, painting for 1 story high school, and 1 story gymnasium, for Chico School Dist., to Wilcoxon & Wilson, 1724 34th St., Sacramento***electrical work, to G. C. Foss, 1720 8th St., Sacramento***plumbing and heating, to Luppen & Hawley, 3126 "J" St., Sacramento***reinforcing steel, to Truscon Steel Co., Atlas Bldg., San Francisco. **P.W.A.** Noted Jan. 7, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Elk Grove—Campbell Constr. Co., general contractors, 800 R St., Sacramento, electrical work for school units, for Elk Grove Union Grammar School Dist. and Elk Grove Union High School Dist., to G. C. Foss, 1720 8th St.***heating for both schools, plumbing on grammar unit, to Hately & Hately, 1710 10th

†*Federal Government.*

Public Buildings (Continued)

...painting, to W. H. Raymond Co., 2710 Donner Way***plumbing for Union High unit, to M. R. Carpenter, 907 Front St., all foregoing contractors in Sacramento. Noted Jan. 18. C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Calif., El Segundo—El Segundo High School reconstructing, rehabilitation, strengthening El Segundo High School, to J. H. Simpson, 524 South Raymond Ave., Pasadena, $207,000. P.W.A. Bids Jan. 27, awarded Jan. 27. Noted Jan. 30, C. D.

Calif., Fort Bragg—Independent Constr. Co., general contractors, 549 Fell St., San Francisco, electrical work for school shops, to Nofrey's Plumbing & Electric Shop, Lakeport, for Fort Bragg Union High School Dist. **P.W.A.** Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

Calif., Grass Valley—E. T. Leiter & Sons, general contractors, 811 36th St., Oakland, electrical work for 1 story school, to Spott Electric Co., 569 10th St., Oakland, for Grass Valley Junior High School Dist.***painting, to J. Bray, Grass Valley***reinforcing steel, to McGrath Steel Co., 354 Hobart St., Oakland***plumbing and heating, to Scott Co., 113 10th St., Oakland. P.W.A. Noted Dec. 20, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Calif., Hanford—Mid State Constr. Co., general contractors, Power Bldg., Fresno, steel tank, in connection with construction hospital units, to Pittsburgh-Des Moines Steel Co., Rialto Bldg., San Francisco, for Kings Co.***plumbing and heating, to B. A. Newman Co., Fresno***painting, to L. Dixon Painting Co., 18 Eureka St., San Francisco***reinforcing steel and iron, to Kyle & Co., Fresno. **P.W.A.** Noted Jan. 6, C. D. —Jan. 9, E. N.-R.

Calif., Los Angeles—Bd. Educ., constructing new 1 story, 97x155 ft. building at Reseda School, 7265 Amigo Ave., Van Nuys, to N. A. Anderson, 111 West 7th St., $62,000***rehabilitating, reconstructing and strengthening main building at 42nd St. School, 4231 4th Ave., to Contracting Engineers, 2310½ West Vernon Ave., $61,990***reconstructing, rehabilitating and strengthening building No. 2 at Fries Ave. School, to H. A. Nichols, 936 East Slauson Ave., $45,710. Grand total $169,610. **P.W.A.** Awarded Jan. 23 and 27.

Calif., San Jose—City Council, furnishing, installing automatic sprinkler system in municipal auditorium, to Rockwood Sprinkler Co., 7 Front St., San Francisco, $4,965. Bids Jan. 20, awarded Jan. 29. Noted Jan. 28, C. D.

Calif., Selma—W. J. Ochs, general contractor, Pacific Southwest Bldg., Fresno, reinforced and structural steel for gymnasium and shop building, for Selma Union High School Dist., to Kyle Co., Fresno***painting, to M. W. Hancock, Fresno***plumbing and sheet metal, to J. E. Pettijohn Co., Delano***electrical work, to Riders Electric Co., Porterville***steel sash, to Michel & Pfeffer Iron Wks., 10th and Harrison Sts., San Francisco. **P.W.A.** Noted Jan. 3, C. D. —Jan. 9, E. N.-R., under "Contracts Awarded."

Conn., Bristol — Louckes & Clarke, general contractors, 6 Ernest St., Wallingford, reinforcing steel for Clarence A. Bingham School, North St., to Scherer Steel Co., Inc., 151 Ballard Dr., West Hartford, for City, K. A. Reiche, supt. of Schools; iron, to New England Iron Wks., 1351 Dixwell Ave., Hamden. Noted Jan. 20, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Conn., East Hartford (br. Hartford)—Bartlett-Brainard Co., general contractors, 16 Van Dyke Ave., Hartford, painting fire station, Main St., to Byrnes-Millward Co., 26 High St., Hartford for Town, Bd. Fire Comrs.***steel erection by Bartlett-Brainard Co., general contractors. Noted Feb. 5, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Conn., East Hartford (br. Hartford)—Bartlett-Brainard Co., general contractors, 16 Van Dyke Ave., Hartford, stone for 2 story, 60x60 ft. fire station, to Dextone Co., 166 Chapel St., New Haven, for Town, Bd. Fire Comrs.*** plumbing, to Byrnes-Millward Co., 26 High St., Hartford***electrical work, to Francis Hoffman, 40 Phelps St., East Hartford***heating, to William B. Carson, Inc., 220 Sargeant St., Hartford. Noted Jan. 22, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

★ **Ill., Chicago**—Bd. Educ., constructing **(A)** masonry, **(B)** fireproofing, **(C)** roofing, **(D)** sheet metal, **(E)** structural steel and iron, **(F)** miscellaneous steel and iron, **(G)** carpentry, **(H)** painting, **(I)** glass and glazing, **(J)** plastering, **(K)** terrazzo, **(L)** tile, **(M)** steam heating, **(N)** heat regulator, **(O)** ventilation, **(P)** plumbing, **(Q)** electrical work, **(R)** steel lockers, for **(1)** 2 story, basement, 100x250 ft. Grace Street Elementary School, Panama and Grave Sts. **(2)** Mount Greenwood Elementary School, 2 story, basement, 100x250 ft., 109th St. and Homan Ave. **(3)** LeMoyne Elementary School, 3 story, basement, 75x85 ft., Wareland Ave. and Rokeby St. **(4)** Lyon Elementary School, 2 story, basement, 63x70 ft., 2941 North McVickers Ave., to Thorgenson & Erickson Co., 228 North LaSalle St., **(A1)** $86,900, **(A3)** $45,000, **(A4)** $25,550***to U. S. Fireproofing Co., 228 North LaSalle St., **(B1)** $11,748, **(B2** $11,545, **(B3)** $5,656***to Illinois Fire Proof Constr. Co., 241 East Ohio St. **(B4)** $1,086***to Esko & Young, 44 North Washtenaw Ave., **(C1)** $1,424, **(C2)** $1,424, **(C3)** $1,674, **(C4)** $1,474***to Luse-Stevenson Co., 228 North LaSalle St., **(D1)** $1,065, **(D2)** $1,065***to L. H. Sohn & Co., 3153 West Grand Ave., **(D3)** $401, **(D4)** $951***to Eggers Iron Co., 304 North Harding Ave., **(E1)** $12,800 ***to Wendnagel & Co., 600 West Cermak Rd., **(E2)** $12,488***to A. F. Anderson Iron Wks., 5836 South Loomis Blvd., **(E3)** $6,178***to Western Architectural Iron Co., 3455 Elston Ave., **(F1)** $2,934, **(F2)** $2,934, **(F3)** $2,188, **(F4)** $887***to Michuda Bros. Constr. Co., 10748 South Michigan Ave., **(G1)** $24,840, **(A2)** $91,898, **(G4)** $7,782***to J. Swanson & Sons, 228 North LaSalle St., **(G2)** $22,652, **(G3)** $16,305***to J. A. Torstenson & Co., 860 Fletcher St., **(H1)** $6,421***to Hansen Bros., 2148 West Chicago Ave., **(H2)** $6,364***to Davis & Kreeger, 211 West 63rd St., **(H3)** $4,497, **(H4)** $2,497***to Simpson-Clark Glass Co., 1680 Wright St., **(I1)** $7,592, **(I3)** $904, **(I4)** $658***to Hamilton Glass Co., 407 North Elizabeth St., **(I2)** $7,552***to Belson Plastering Co., 160 North LaSalle St., **(J1)** $8,080*** to W. Williams, 2841 Edgewood Ave., **(J2)** $8,459, **(J3)** $6,222***to C. Graf & Sons, Inc., 3301 West 60th Pl., **(J4)** $3,150***to Rennen Terrazzo Mosaic Co., 11 South LaSalle St., **(K1)** $1,696, **(K2)** $1,722, **(K3)** $3,002, **(K4)** $2,454***to Uptown Tile Co., 1475 Irving Park Blvd., **(L1)** $978, **(L2)** $978, **(L3)** $567***to Wendt & Cone Co., 2124 Southport Ave., **(M1)** $21,965***to A. F. Walsh, Inc., 7445 Exchange Ave., **(M2)** $22,025***to C. W. Johnson, Inc., 221 North Desplaines St., **(M3)** $15,523, **(M4)** $2,595***to National Regulator Co., 2301 Knox Ave., **(N1)** $2,118, **(N4)** $680***to Powers Regulator Co., 2720 Greenview Ave., **(N2)** $2,145***to Johnson Service Co., 1355 Washington Blvd., **(N3)** $1,442***to Hunter-Clark Ventilating System Co., 2800 Cottage Grove Ave., **(O1)** $8,800***to Acme Heating & Ventilating Co., 4224 South Lowe Ave., **(O2)** $8,820***to Rud Wiersig, Inc., 2311 North Calif. Ave., **(O3)** $5,939***to Bloomer Heating & Ventilating Co., 1245 West 47th St., **(O4)** $2,600***to M. J. Corboy Co., 405 North Des Plaines St., **(P1)** $12,620***to Fettes-Love-Sieben, 4105 North Damen Ave., **(P3)** $8,600 ***to Economy Plumbing & Heating Co., 1308 South Crawford Ave., **(P2)** $13,666, **(P4)** $1,135***to Garden City Eng. Co., 100 North LaSalle St., **(Q1)** $9,655, **(Q2)** $9,713, **(Q3)** $5,175, **(Q4)** $2,003***to All Steel Equipment Co., 326 South Jefferson St., **(R1)** $1,735 **(R2)** $1,736***to Durabilt Steel Locker Co., Aurora, **(R4)** $561. Grand total $635,894. **P.W.A.** Awarded Jan. 22, 25 and 26.

Ill., Chicago—Bd. Educ., masonry and glazing for 3 story, basement, 71x78 ft. Kilmer Elementary School, North Shore and Greenview Ave., to W. E. O'Neil Constr. Co., 2751 Clybourn Ave., $33,350***steel lockers, to Surabilt Steel Locker Co., Aurora, $1,491***sheet metal, to Perkinson & Brown, 412 North Lincoln St., $1,324***miscellaneous steel and iron, to Titan Ornamental Iron Co., 2239 West 35th St., $830***carpentry, to H. A. Hanson Constr. Co., 1851 Elston Ave., $13,547***painting, to P. Gottardo, 3904 North Linden Ave., $2,920*** plastering, to W. Williams, 2841 Edgewood Ave., $4,693***terrazzo, to Renner Terrazzo Mosaic Co., 11 South LaSalle St., $4,750***steam heating, to S. J. Reynolds Co., 2223 Ogden Ave., $6,538***ventilation, to Bloomer Heating & Ventilating Co., 1245 West 47th St., $6,475*** electrical work, to Wadeford Electric Co., 205 West Wacker Dr., $2,930***fireproofing, for Kilmer School and for 3 story, 112x117 ft. Emmett Elementary School, 5500 West Madison Ave., to Illinois Fire Proof Constr. Co., 241 East Ohio St., $6,845 and $10,889 respectively ***roofing, to Jacobson Roofing Co., 1512 North Western Ave., $1,287 and $2,745 respectively ***structural steel and iron, to A. N. Anderson Iron Wks., 5844 South Loomis Blvd., $7,204 and $11,459 respectively***tile, to Upton Tile Co., 1475 Irving Park Blvd., $809 and $437 respectively***marble, to James B. Clow & Sons, 2338 South Western Ave., $538 and $583 respectively***heat regulator, to Johnson Service Co., 1355 Washington Blvd., $1,247 and $1,926 respectively***plumbing, to United Plumbing & Heating Co., 3012 West Roosevelt Rd., $5,274 and $6,623 respectively***masonry for Emmett School, to F. Burke & Son, 35 South Dearborn St., $53,186***sheet metal, to Kitzelman Sheet Metal Wks., 4343 Cottage Grove Ave., $2,008 ***miscellaneous steel and iron, to Western Architectural Iron Co., 3455 Elston Ave., $2,786 ***carpentry, to Herman Reinings & Sons, 320 Home Ave., Oak Park, $24,162***painting, to J. C. Carrier, 129 South Parkside Ave., $4,942 ***plastering, to C. Graf & Sons, Inc., 3301 West 60th Pl., $9,135***terrazo, to American Mosaic & Terrazzo Co., 1730 Carroll Ave., $4,640***steam heating, to L. H. Prentice Co., 1048 Van Buren St., $15,554***ventilating, to G. E. Mathis & Son, 5058 South Western Ave., $8,500***electrical work, to Fries-Walters Co., 2001 West Pershing Rd., $8,626. Grand total $270,253. **P.W.A.** Bids Jan. 21. Noted Jan. 30, C. D.—Jan. 16, E. N.-R.

†Ill., Danville — Vet. Bu., Arlington Bldg., Wash., D. C., refrigeration and ice making plant, to Kohlenberger Eng. Corp., 805 South Sparda Rd., Fullerton, Calif., $19,498.

Ind., Mishawaka—Bd. School Trustees, general contract 2 story, basement, brick school, plain found., to Gollitt Constr. Co., South Bend, $133,120***heating and plumbing, to J. Lige, Auburn, $40,496***electrical work, to Soens Electric Shop, Mishawaka, $6,780. Grand total $180,395. **P.W.A.** Bids Jan. 21. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Kan., Eldorado—Bd. Educ., 3 story, basement, brick, rein.-con. high school, plain found., complete with all equipment, to Rinehardt & Donivan, Oklahoma City, Okla., $162,390. **P.W.A.** Bids Jan. 13. Noted Jan. 10, C. D.—Oct. 3, E. N.-R.

Mass., Avon—Town, W. W. Littlefield, chn. Building Comn., Town Hall, 2 story, basement, 67x107 ft., brick, steel Gifford School addition and alterations, concrete found., incl. heating, plumbing, electrical work, to Klayman Constr. Co., 92 Hazelton St., Mattapan, Boston, $79,842. Bids Jan. 22, awarded Feb. 5. **P.W.A.** Noted Jan. 28, C. D.—Jan. 9, E. N.-R.

†Mass., Boston—Yards & Docks, Navy Dpt., Wash., D. C., elevator doors and equipment at Navy Yard, Spec. 8039, to A. B. See Elevator Co., Inc., 164 Stuart St., $3,312 (90 days).

Mass., Boston—A. Piotti Co., general contractors, 708 Dudley St., Dorchester, plumbing for English High School addition, to M. Ahern, 711 Boylston St., for City, Dpt. Building, W. W. Drummey, supt. of construction***heating and ventilating, to Power Heating & Ventilating Co., Inc., 263 Harrison Ave.***electrical work, to Quinn Bros., 239 A St., South Boston***caissons-piles, to John P. Cavanagh Co., 25 Medway St., Dorchester***structural steel, light iron, to Hub Steel & Iron Wks., Inc., 43 Freemont St., Somerville***roofing, copper flashing, to Burgess & Blacher Co., 18 Eustis St., Roxbury***reinforcing steel, to Barker Steel Co., 238 Main St., Cambridge***painting, to Russell E. McCassey, 54 Playstead Rd., Newton. Noted Jan. 23, C. D. —Jan. 30, E. N.-R., under "Contracts Awarded."

Mass., Uxbridge—Town, Supt. Schools, Center Fire Station, Main St., brick, steel high school, to M. J. Walsh & Sons, 1412 Dwight St., Holyoke, $163,487. **P.W.A.** Bids Jan. 30. Noted Jan. 22, C. D.—Dec. 26, E. N.-R.

Mass., Watertown—M. S. Kelliher Co., general contractors, 38 Chauncy St., Boston, for Town, School Committee, Administration Bldg., Main St., cast stone for Francis Phillips Dist. Elementary School, to Emerson & Norris Co., 163 North Beacon St., Brighton***granite, to Austin Ford & Son, Inc., 73 Main St., Cambridge***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***plumbing, to M. Ahern, 711 Boylston St., Boston***electrical work, to Friedman Electric Co., 137 Pearl St., Boston***reinforcing steel, to Grid Flat Slab Corp., 761 Dudley St., Dorchester***painting, to Johnson-Foster Co., 29 Meacham Rd., Somerville***excavating, to Otto A. Theurer Contg. Co., Inc., 171 Watertown St., Watertown***roofing, to Atlantic Roofing & Skylight Wks., 19 Howard St., Roxbury***heating, to J. W. Praught & Co., 1049 Dorchester Ave., Dorchester. Noted Jan. 2, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Mass., Worcester—I. P. Rocheford, general contractors, 8 Arlington Pl., Framingham, finish for school Chatan St., to M. K. Smith Corp., 35 Central St., Worcester, for City, J. T. Tinsley, trustee***structural steel and iron, to Eastern Bridge & Structure Co., 88 Crescent St., Ware ***roofing, to L. Cutler, 21 Harrison St.*** plumbing, to J. J. McGrath, 97 Foster St.*** electrical work, to Scrimgeour Electric Co., 87 Central St.***heating, to J. G. Lamotte & Sons, Inc., 54 Commercial St. Noted Jan. 14, C. D.— Jan. 16, E. N.-R., under "Contracts Awarded."

Mich., Sturgis—City, furnishing, installing two 875 hp. Diesel oil engines in auxiliary light plant, incl. switchboards, to Busch-Sulzer Bros., 3300 South 2nd St., St. Louis, Mo., $107,421.

Mo., Jefferson City — State, State Building Comn., renovating interior and exterior of state capitol, incl. tuckpointing, painting windows, repairing roof, painting interior woodwork, cleaning murals, etc., relief labor under supervision of G. E. McIntyre, c/o owner, engr. W.P.A. allocated $219,000.

★ **Mo., Kansas City**—City, constructing 32 story, basement, 130x180 ft., steel, concrete city hall, 12th and Oak Sts., to Swenson Constr. Co., Victor Bldg., Kansas City, $1,497,989. **P.W.A.** Bids Jan. 30. Noted Feb. 3, C. D. —Feb. 6, E. N.-R.

★ **N. Y., Brooklyn**—Bd. Educ., 500 Park Ave., New York, general contract P.S. 239, to G. F. Driscoll Co., 550 Union St., $1,077,782. **P.W.A.** Bids Feb. 4. Noted Feb. 5, C. D.— Jan. 30, E. N.-R.

★ **N. Y., Brooklyn**—Bd. Educ., 500 Park Ave., New York, general contract P.S. 234, to Psaty & Fuhrman, Inc., 369 Lexington Ave., New York, $549,000. **P.W.A.** Bids Jan.28. Noted Jan. 29, C. D.—Jan. 16, E. N.-R.

†N. Y., Endicott—Ross & Reid Stone Setting Co., general contractors, 21 L St. S.W., Wash., D. C., plumbing and heating for federal building, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to C. W. Midgley, 308 South Badger Ave., Endicott***electrical work, to E. A. Davis, 64 Conklin Ave., Binghamton***excavation and concrete, to Triple Cities Constr. Co., 17 Tompkins St., Binghamton***ornamental iron, to Usone Mfg. Co., 3512 Chouteau Ave., St. Louis, Mo.***structural steel, to McClintic Marshall Co., Bell Ave. and Abby St., Buffalo. Noted Nov. 19, C. D.—Nov. 28, E. N.-R.

N. Y., Ithaca—A. H. McPherson, general contractor, Ithaca, steel for school, to Kalman Steel Co., Bethlehem, Pa., for Bd. Educ., City Hall; metal lathing and plastering to Henderson-Johnson Co., 1407 Erie Blvd., East Syracuse. **P.W.A.** Noted Dec. 17, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded"

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†Federal Government.

Public Buildings (Continued)

N. Y., Jamestown—Bureau P. Utilities, City Hall, furnishing piping, valves, fittings for steam generating units at Steele St. power plant, to National Valve & Mfg. Co., 3101 Liberty St., Pittsburgh, Pa., $9,458; installing work for steam generating units, to Ehret-Magnesia Co., 1315 West Cumberland St., Phila., Pa., $1,660. Bids Jan. 28.

★ **N. Y., New York**—Dpt. Hospitals, Municipal Bldg., general contract superstructure Pavilions C and D Bellevue Hospital, to C. T. Willis, Inc., 285 5th Ave., New York, $1,697,000***plumbing, to Jarcho Bros., Inc., 215 East 37th St., $259,777***heating, to W. G. Cornell Co., 350 5th Ave., $187,917. Grand total $2,144,694. **P.W.A.** Contracts awarded in January, work started, except plumbing which was awarded in February. Bids Nov. 27. Noted Nov. 29, C. D.—Nov. 21, E. N.-R.

N. Y., Philadelphia—Union School Dist. 3, foundations and grading for grade and high school, to H. J. Wright, 128 Sterling St., Watertown. **P.W.A.** D. D. Kieff, Commerce Bldg., Watertown, archt. Bids about Feb. 15, on superstructure. Noted Jan. 22, C. D.—Jan. 27, E. N.-R.

N. Y., Rochester—City, City Hall, excavating and grading for central fire headquarters, to Rappl & Hoenig, 2350 East Ridge Rd. **P.W.A.** Bids Feb. 5. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

N. Y., Schoharie—See "Bids Asked."

N. Y., Springfield—Bd. Educ., 500 Park Ave., New York, plumbing for Andrew Jackson High School, 116th Ave. and 208th St., to J. E. Kahn, 224 West 20th St., New York, $141,823. Bids Dec. 10. Noted Dec. 11, C. D.

★ **N. Y., West New Brighton**—Bd. Educ., 500 Park Ave., general contract Curtis High School, to Psaty & Fuhrman, Inc., 369 Lexington Ave., New York, $637,000. **P.W.A.** Bids Jan. 28. Noted Jan. 29, C. D.—Jan. 23, E. N.-R.

N. Y., Wilmington—Dpt. P. Wks., Albany, acoustical treatment for upper toll house on Whiteface Mountain, to Acoustical Installations Corp., 101 Park Ave., New York***masonry, granite and stone, to A. L. DeLucia, 166 Orange St., Albany***metal and kalamein, to H. D. Munger, 110 Wall St., Schenectady***tile, marble and slate, to Schenectady Tile Co., Inc., 785½ State St., Schenectady***reinforcing steel, to Albany Steel & Iron Supply Co., Inc., Troy Rd., Menands***metal works and metal trim, to Metal Door & Trim Co., LaPorte, Ind. Noted Nov. 19, C. D.—Nov. 21, E. N.-R.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, remodeling "C" building, incl. heating, plumbing and electrical work at Mental Hospital, to H. M. Soule, 110 Brook St., Pawtucket, $76,950. **P.W.A.** Bids Jan. 28, awarded Jan. 31. Noted Feb. 4, C. D.—Jan. 30, E. N.-R.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, plumbing for 2 story, basement, 135x228 ft. male ward building at Mental Hospital, to H. L. Graham & Son, 146 High St., Pawtucket, $17,457. Bids Dec. 9, awarded Jan. 31. **P.W.A.**

R. I., Kingston—Rowley Constr. Co., general contractors, 260 Central Ave., Pawtucket, waterproofing and dampproofing for library and administration building, at State College, to Western Waterproofing Co., Inc., 82 West Dedham St., Boston, Mass.***building finish, to L. Vaughn Co., 1153 Westminster St., Providence***marble, to New England Marble Co., Inc., 268 Hartford Ave., Providence***roofing, to Eagle Cornice Co., 341 Blackstone St., Providence***painting, to Scully-McDonnell & Co., Inc., 71 Tyndall Ave., Providence. Noted Dec. 17, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

R. I., Kingston — State, Emergency P. Wks. Comn., State House, Providence, automatic sprinkler system for Dairy Barn Group, East Hall and Lippett Hall at State College, to Viking Automatic Sprinkler Co., 430 Statler Bldg., Boston, Mass., $7,288. **P.W.A.** Bids Jan. 13, awarded Jan. 31. Noted Jan. 20, C. D.

R. I., North Smithfield—Town, Town Clerk, Town Hall, Main St., F. W. Nichols, chn., general contract 2 story, basement, brick, steel school, Slatersville, to Enterprise Building Co., Gilbert St., Woonsocket, $73,884***heating and plumbing, to Raoul Renard Plumbing & Heating Co., 56 Cumberland St., Woonsocket, $6,185 and $3,600 respectively***electrical work, to A. P. Belleveau, 2 Monument St., Woonsocket, $3,145. Grand total $86,814. Bids Jan. 15, awarded Feb. 5. **P.W.A.** Noted Oct. 9, C. D.

R. I., Providence—City, Bd. Contr. & Supply, City Hall, awarded plumbing contract for Senior High School, Mt. Pleasant Ave., to C. H. Cronin, Inc., 14 Byron St., Boston, Mass., $99,800. **P.W.A.** Bids Oct. 14. Noted Jan. 29, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

R. I., Warwick — Hanson & Erickson, Inc., general contractors, Greenwood Ave., Greenwood, heating and plumbing for municipal building, for City, Building Comn., City Hall, Apponaug, to C. H. Johnson, Apponaug***electrical work, to Stanford Electric Constr. Co., 4 Westminster St., Providence***reinforcing steel, to G. F. Swanson, Inc., 87 Weybosset St., Providence*** structural steel, to James H. Tower Iron Wks., 50 Borden St., Providence***roofing and sheet metal, to Providence Cornice Co., 309 Canal St., Providence***painting and finish, by General Contractors***cast stone, to N. E. Cast Stone Co., 4 Edwards St., Providence***excavation, to B. Jordan, 171 Westminster St., Providence*** concrete blocks, to Apponaug Concrete Products, Apponaug. Noted Jan. 20, C. D. — Jan. 23, E. N.-R., under "Contracts Awarded."

R. I., Warwick—City, School Building Comn., City Hall, general contract 2 story, basement school, Gaspee Plateau, to Central Eng. & Constr. Co., 210 Main St., Pawtucket, $132,220 ***heating, to Taylor Heating Co., 714 Broad St., Providence, $12,490***plumbing, to Jas. S. Cassedy, Inc., 133 Austin St., Cambridge, Mass., $7,900***electrical work, to Brady Electric Co., Inc., 236 Bedford St., Fall River, Mass., $8,950. Grand total $161,560. **P.W.A.** Bids Jan. 13, awarded Jan. 20. Noted Jan. 20, C. D.

Wash., Ellensburg — State Normal School, constructing auditorium-classroom, to Henrikson-Alstrom Constr. Co., Textile Tower, Seattle, $174,332. This contract had previously been awarded to Roberts & Johnson, Tacoma. Due to death of both partners firm was forced to suspend operation, and next low bidder received job. Noted Jan. 3, C. D.—Jan. 9 and Feb. 6, E. N.-R., under "Contracts Awarded."

★ **Wash., Seattle**—University of Washington, general contract constructing chemistry building on campus, to Sound Constr. Co., Northern Life Tower, $451,862***plumbing and heating, to Wenzler & Ward, Textile Tower, Ashwell Twist Co., 967 Thomas St., and Rautman Plumbing & Heating Co., 115 Jackson St., bidding jointly, $283,700***fixtures, to Warrack Constr. Co., 1331 Third Ave., $99,183*** electrical work, to O. A. Carlson Electric Co., 2212 Second Ave., $68,534***lighting fixtures, to Cascade Fixture Co., 1720 Yale St., $30,000. Grand total $933,279. Noted Feb. 5, C. D.

Wis., Westboro—School Dist. 1, heating for school addition, to Buehrens Co., Westboro, $3,980; electrical work, to M. F. Hodge & Son, Westboro, $649. **P.W.A.** Bids Jan. 13. Noted Nov. 14, C. D.

COMMERCIAL BUILDINGS

PROPOSED WORK

Mo., Cape Girardeau—Owner, c/o Manske & Rotty, archts., 506 North Vandeventer Ave., St. Louis, soon takes bids 5 story, basement, 38x40 ft., rein.-con., brick addition to Marquette Hotel.

N. Y., Brooklyn—Chestnut Studios, c/o Warner Bros., 321 West 44th St., New York, plans by T. W. Golding, 607 5th Ave., New York, altering 3 story motion picture studio, 1262 East 14th St. $300,000.

N. Y., Brooklyn—Dime Savings Bank of Williamsbridge, 209 Havermeyer St., plans by V. Sackheim, 516 Avenue L, altering heating in 4 story apartments, 234 Linden Blvd., and at 2180 A Fulton St, $37,000 with fixtures.

N. Y., Brooklyn—F. and J. Land Co., 3217 Bedford Ave., plans by Cohn Bros., 191 Joralemon St., 6 story, brick apartment, Avenue P and West 13th St. $250,000.

N. Y., New York—W. I. Kimbel, 15 East 60th St., plans by W. F. Scharn, c/o owner, altering heating in 5 story store and apartment, 17 East 60th St. Est. $37,000 with fixtures.

N. Y., New York—Eastminister Realty Corp., 978 2nd Ave., plans altering heating in 5 story apartment, 313 East 46th St. $37,000 with fixtures. Private plans.

★ **N. Y., New York**—Absar Realty Corp., 1457 Boscobel Ave., plans by C. Kreymborg, 902 Gerard Ave., 6 story, brick apartment, 254th St. and Fieldstone Rd. $500,000.

★ **N. Y., New York**—J. F. Meehan, 1475 Bway., plans 12 story apartment, Grand Concourse and 161st St. $1,200,000. Private plans. Site acquired.

O., Cleveland — First Hungarian Lutheran Church, A. M. Lefflier, pastor, 8023 Rawlings Ave., plans 1 story, basement, brick, steel church, on Buckeye Rd. $150,000. Architect appointed soon.

Pa., Lancaster—Grandview Heights Corp., 19 North Queens St., bids in spring, group of 1 family, brick, stone, frame houses for residential colony, plain founds. $250,000. Private plans.

Tex., Dallas—Baker Hotel Co., c/o F. J. Baker, pres., 4218 McFarlin St. and Baker Hill, plans 400 room addition to hotel, Commerce and Akard Sts., incl. banquet and convention hall, etc.

Tex., Dallas—Southern Methodist University, c/o C. C. Seleman, pres., plans by DeWitt & Washburn, 1013 Praetorian Bldg., college building, $400,000.

Ont., Timmins—St. Anthony's Roman Catholic Church, 16 Fifth St., plans rebuilding 1 story, basement, brick, stone church, on Fifth St., destroyed by fire. $200,000. Architect and engineer not appointed.

★ **Ont., Toronto**—W. J. Blainey Ltd., purchased 20 acre site and plans constructing 200 houses on Weston Rd. $500,000.

BIDS ASKED

N. Y., Great Neck—See "Contracts Awarded."

N. Y., Jackson Heights — See "Contracts Awarded."

O., Hamilton—St. Ann Catholic Church bids about Apr. 1, on 1 story, basement, 52x150 ft., concrete church, $200,000. E. J. Shulte, Cincinnati, archt.

CONTRACTS AWARDED

N. Y., Brooklyn—Almor Operating Co., M. Solomon, pres., 113 West 42nd St., New York, altering heating in 5 story store and apartments, Tompkins Ave. and Fulton St., separate contracts now being awarded. $40,000 with fixtures. L. and L. Levy, 527 5th Ave., New York, archts.

N. Y., Great Neck—Callan Bros., Inc., 166-30 26th Ave., Flushing, constructing group frame dwellings, Great Neck Hills, day labor and separate contracts. To exceed $250,000. Noted Jan. 8, C. D.—Jan. 16, E. N.-R.

N. Y., Jackson Heights—Corporation, c/o A. Shanik, 26 Court St., Brooklyn, 6 story apartment, 73rd Ave., separate contracts and day labor. $150,000. Kavy & Kavovitt, 26 Court St., Brooklyn, archts. Noted Jan. 13—C. D.—Jan. 16, E. N.-R.

N. Y., New York—Marion Avenue Development, Inc., 350 East 149th St., 6 story apartment, Marion Ave. and Bedford Park Blvd., separate contracts now being awarded. $150,000. I. L. Crausman, 332 East 149th St., archt.

N. Y., New York — One Hundred Seventy-Third Street Realty Corp., 1606 Jerome Ave., constructing apartment, 173rd St. and Schieren Ave., separate contracts now being awarded. Est. about $140,000. C. Schaefer, Jr., 3347 East 149th St., archt.

N. Y., St. Albans—Florence Abrams, 90-24 Sutphin Blvd., group 1 story, frame dwellings, 120th Ave. and 178th St., separate contracts and day labor. $140,000. J. E. Cahill, 90-24 163rd St., Jamaica, archt. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., Springfield—E. and L. Realty Corp., 127-05 Merrick Rd., constructing group 2 story frame dwellings 178th St. and 132nd Ave., separate contracts now being awarded. $140,000. Lama & Proskauer, 383 Jay St., Brooklyn, archts. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. Y., Valley Stream—Valley Stream Park Development, J. Schlossman, in charge, constructing group 50 brick, stone dwellings, Merrick Rd. and Sunrise Highway, separate contracts now being awarded. To exceed $150,000. Noted Jan. 8, C. D.—Jan. 16, E. N.-R.

Tex., Amarillo—Amarillo Junior College, c/o J. B. Dooley, pres., Amarillo, plain foundations for 2 story, basement, brick, rein.-con., steel Junior College, incl. classrooms, library, auditorium, offices, etc., to S. Pelton, Amarillo, $8,485. Total est. $115,000. Bids soon on superstructure. Noted Sept. 19, C. D.—Sept. 26, E. N.-R.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ia., Dubuque—DISTRIBUTION BUILDING—Schmidt Brewing Co. soon takes bids distribution building. $45,000.

Ia., East Des Moines — SHOP, etc. — Des Moines Railway Co., 114 11th St., plans constructing shop and car barns. $40,000. Maturity indefinite. Architect not appointed.

Md., Baltimore — WAREHOUSE — Baltimore Pure Rye Distilling Co., Sollers Point Rd., soon lets contract 6 story, 120x200 ft. new rack house, Sollers Point Rd. $100,000. C. H. Osborn, 212 West Franklin St., mgr.

Md., Baltimore—STORAGE, etc.—Williams Coal Co., 2634 West North St., plans storage and yards, 2634 West North St. $37,000 with equipment. Architect not appointed.

Mass., Fall River—MILL—Union Mills, Pleasant St., plans by D. Shapiro, 58 Weybosset St., Providence, R. I., mill additions, incl. storehouse and garage, Pleasant St. To exceed $40,000.

Mass., Marshfield—FACTORY—Chandler Lobster Pot plans rebuilding factory. To exceed $37,000 with equipment. Fire loss $50,000. Architect not appointed.

Mass., Springfield — BREWERY — Commonwealth Brewing Co., Liberty St., plans reconditioning brewery, Liberty St. To exceed $40,000.

Mich., River Rouge—GAS HOLDER—Ford Motor Co., Dearborn, plans steel gas holder on concrete and pile found. Shreve, Anderson & Walker, 857 Book Bldg., Detroit, archts.

Minn., Minneapolis—GRAIN ELEVATOR—Bunge Elevator Co., J. Kellogg, vice-pres., 309 Chamber of Commerce, Minneapolis, constructing 1,250,000 bushel storage elevator and 100,000 bushel working elevator, Ave. S.E. and Como Ave. between 13th and 14th Sts. $400,000.

Mo., St. Louis—PUBLISHING PLANT—Daily Record Co., H. B. Morse, pres., 1010 Fullerton Bldg., soon lets contracts 3 story, basement, 59x94 ft., rein.-con., limestone, granite publishing plant, air-conditioning equipment. Market and 10th Sts. Est. about $125,000. Mauran, Russell & Crowell, 1620 Chemical Bldg., archts.

N. Y., Brooklyn—STORAGE, etc.—Rockwood & Co., 88 Washington Ave., plans by C. J. Wolfe, 525 58th St., altering 4 story, brick storage, 31 Waverly Pl. $37,000 with equipment.

N. Y., Geneva—WAREHOUSE—Geneva Refrigerating Co. plans constructing storage warehouse, Ave. D. $40,000. Private plans.

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†*Federal Government*

Industrial Buildings (Continued)

N. Y., New York — FACTORY — First and 40th Street Corp., 344 East 40th St., bids after Feb. 15, altering 5 story factory, 695 1st Ave., $45,000. J. Lubroth, 26 Court St., Brooklyn, archt. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., New York—STORAGE—United Dressed Beef Co., 780 1st Ave., plans by S. Daub, 63 Park Row, altering 5 story storage building, 421 East 43rd St. $37,000 with equipment.

N. Y., Niagara Falls—PLANT—Mathieson Alkali Wks., Inc., 2400 Buffalo, Ave., soon lets contract constructing plant.

N. C., Walnut Cove—PLANT—Walnut Cove Veneer Co. plans plant. $40,000. Architect not appointed. **Maturity indefinite.**

O., Cincinnati—SERVICE STATION, etc.—Gulf Oil Co., 7th & Grant Sts., Pittsburgh, Pa., plans group of 5 or more service stations and repair shops on various locations. To exceed $45,000.

O., Cleveland—SERVICE AND STORAGE—Thompson Products Co., 2196 Clarkwood Rd., plans altering and equipping 5 story service and storage on Ashland Rd., $40,000 or more with equipment.

O., Girard—PLANT—Golden Glow Dairy Co. plans additions and alterations to dairy plant, Churchill Rd. $37,000 with equipment.

O., Hamilton — PLANT — Hamilton Brewing Co. plans additions to brewing and bottling plant. To exceed $50,000.

O., Sebring—PLANT—**H. Bettis Co., Zanesville**, plans altering and improving container manufacturing plant, 12th St. $37,000 with equipment.

Ore., Independence—CANNING PLANT—Independence Canning Co., c/o E. W. Scribner, plans canning plant. $39,000.

Pa., Berwick—WAREHOUSE—Berwick Store Co. plans warehouse and storage. Est. about $40,000. **Maturity indefinite.** Architect not appointed.

Pa., Llyswen (Altoona P. O.)—PLANT—Brumbaugh Body Co., C. Brumbaugh, pres. and mgr., 3031 6th Ave., Altoona, purchased property and buildings at Plank Rd. and Logan Ave., and plans rehabilitating and installing new equipment in same. To exceed $37,000.

Pa., Washington — PLANT — River Rasin Paper Co., Monroe, Mich., plans alterations and improvements to plant. $100,000.

R. I., Providence — FRUIT PRODUCE — F. Chiaverini, archt., 32 Broadway, revising plans 1 story, basement, 27x271 ft. fruit produce building, Hemlock and Valley Sts., for Governor Dyer Market Assoc., c/o architect. Former bids rejected. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

Tex., Brady — WAREHOUSE, etc. — E. A. Mogan, Brady, plans 2 story warehouse and office. $45,000. Private plans.

Tex., Brownsville—GRAIN ELEVATOR—B. L. Miller, Brownsville, plans brick, rein.-con. grain elevator, plain found., at deep water port. Est. $70,000. Architect, c/o owner, engr.

Tex., Dumas — PLANT — Columbian Carbon Co., 45 East 42nd St., New York, soon lets contract carbon black plant. Est. $200,000.

Tex., Edinburg—CANNING PLANT—Owner, c/o Chamber of Commerce, Brownsville, plans brick, rein.-con. vegetable and citrus canning plant. Est. $65,000. Private plans.

Tex., Post—STORAGE—Garza County Warehouse & Marketing Assn. plans cotton storage. $40,000. **Maturity indefinite.** Architect not appointed.

Tex., San Benito—GRAIN ELEVATOR—B. L. Miller, Brownsville, plans brick, corrugated iron grain elevator. Architect, c/o owner, archt.

Va., Roanoke—PLANT—Tennessee Coal, Iron & R.R. Co., Birmingham, Ala., plans improving plant. To exceed $40,000. **Maturity later.**

★ **Wash., Seattle** — GARAGE — Adams & Lemcke, 1 West Highland Dr., in response to city's call for bids for garage facilities, offered to build garage with facilities for 306 automobiles, to be purchased by city over 10 year period. $578,000.

Wis., Middleton—FEED MILL, etc.—William Hoffman, Middleton, plans feed mill and garage. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Wis., Milwaukee — PLANT — International Printing Ink Corp. of Wisconsin, 341 Milwaukee St., plans rebuilding plant, 431 Milwaukee St. To exceed $100,000. **Maturity indefinite.** Architect not appointed.

Alta, Edmonton—PLANT—G. A. Gaherty of Calgary Power Co. plans constructing plant. $200,000.

N. B., St. John—PLANT—Hadley Mfg. Co. plans plant for manufacturing building materials. $80,000.

Ont., Hamilton—GARAGE, etc.—General Motors Products of Canada Ltd., Detroit, Mich., and 360 Sparks St., Ottawa, plans by Hutten & Souter, Piggott Bldg., and soon takes new bids constructing 2 story, 70x100 ft., brick, steel garage, showroom and office building, Bay and George Sts. $80,000. Noted Aug. 19, C. D.—Aug. 22, E. N.-R., under "Commercial Buildings."

Ont., Orangeville — GARAGE, etc. — Bryan's Garage, R. D. Bryan, preparing plans 2 story, 50x125 ft., tile, steel garage, repair shop replacing building destroyed by fire. Interested in prices complete equipment. $25,000.

Ont., Sudbury—PLANT—Falconbridge Nickel Mines Ltd., Toronto and Sudbury, plans improvements to plant. To exceed $37,000.

Que., Montreal—PLANT—A. W. Locke Ltd., F. C. Dobell, dir., plans plant for chemical preparations. $100,000.

BIDS ASKED

Calif., Los Angeles—MARKET, etc.—Morgan, Clements and Walls, archts., 1135 Van Nuys Bldg., taking bids 1 story, basement, 125x148 ft., rein.-con. market and store, for Broadman Development Co., South Broadway, between 87th and 88th Sts. $40,000.

Ga., Atlanta—BOTTLING PLANT—See "Contracts Awarded."

Mass., Fall River—MILL ADDITION—See "Contracts Awarded."

N. Y., Brooklyn—STORAGE—G. D. McCurdy, North Bellmore, bids about Mar. 1, constructing storage, Gardner Ave. and Stagg St. Est. $37,000 with equipment. W. A. Lacerenza, 391 Fulton St., archt. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

N. Y., Long Island City—PLANT—See "Contracts Awarded."

N. Y., New York—SERVICE STATION—See "Contracts Awarded."

N. Y., New York—GARAGE—See "Contracts Awarded."

Ontario — MINING DEVELOPMENT — See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Los Angeles — FREIGHT HOUSE — Santa Fe Ry. Co., Kerchoff Bldg., 1 story, 50x400 ft., freight house, automobile loading dock, etc., Santa Fe, 3rd and 4th Sts., to W. P. Neil Co., 4671 East 49th St., about $45,000. Awarded Jan. 28. Private plans.

Calif., Napa—FACTORY—P. J. Walker Co., general contractors, Sharon Bldg., San Francisco, structural steel and iron work for factory, Soscol Ave., to Herrick Iron Wks., 18th and Campbell Sts., Oakland, for Rough Rider Mfg. Co., 175 12th St., San Francisco***concrete mix, to Basalt Rock Co., Napa***steel sash, to Soule Steel Co., 1750 Army St., San Francisco ***reinforcing steel, to W. S. Wetenhall, 17th and Wisconsin Sts., San Francisco***steel rolling doors, to D. A. Pancoast, 26 O'Farrell St., San Francisco. Noted Jan. 27, C.D.—Sept. 19, E.N.-R.

Calif., Oakland—PLANT IMPROVEMENTS—California Cotton Mills Co., Railroad Ave. and Kennedy Sts., plant improvements, separate contracts awarded. **Est. $100,000.**

Calif., Vernon—FACTORY—Technicraft Co., 407 East Pico Blvd., Los Angeles, 1 and 2 story, 50x140 ft., rein.-con. factory, to R. E. Millsap, 603 Pacific Commerce Bldg., Los Angeles, approximately $40,000. A. E. Hansen, 832 South Glendale Ave., Glendale, archt.

Conn., New Haven—BREWERY—Fusco Amatruda Co., general contractors, 59 Amity Rd., roofing for 2 story, 72x112 ft. brewery, to John E. Daley Co., 181 North Colony St., Wallingford, for Hull Brewing Co., 820 Congress Ave.***iron, to Addehurst Iron Wks. Co., 52 Richard St.***insulation, to Armstrong Corp. Products Co., 295 5th Ave., New York ***structural (No. 2 building), to Porcupine Co., Fairfield Ave., Fairfield***reinforcing steel for No. 2 building, to Topper & Griggs, 200 North Main St., West Hartford***plumbing, to Herpich Co., Inc., 543 Congress Ave., New Haven. Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

Ga., Atlanta — BOTTLING PLANT — Luckie Operating Co., 119 Luckie St., 1 and 2 story, 160x160 ft., brick, tile bottling plant, etc., day labor. Est. $40,000. E. C. Seiz, Atlanta, archt.

Ga., Warm Springs—FILLING STATION—Standard Oil Co., 746 Marietta St., Atlanta, c/o J. C. Pittman, supt. of construction, 1 story filling station, to Flagler Constr. Co., Atlanta. Private plans.

★ **Ill., Chicago** — PLANT — Sherwin-Williams Co., 101 Prospect Ave. N.W., Cleveland, O., plant, 548 East Kensington Ave., to Lundoff-Bicknell Co., 100 North LaSalle St. Est. $500,000. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

Ky., Louisville—PLANT—Falls City Brewing Co., 31st St. and Broadway, addition to plant, to J. F. Russell Co., 113 West Chestnut St. Est. $100,000. Noted Jan. 13, C. D.—Jan. 16, E. N.-R.

Md., Baltimore—PLANT—Chemical & Pigment Co., 6401 St. Helena Ave., plant addition, to Price Constr. Co., Maryland Trust Bldg. Est. $45,000.

Mass., Fall River—MILL ADDITIONS—Union Mills, Pleasant St., brick, steel storehouse and garage addition to present mill buildings, Pleasant St., day labor. D. Shapiro, 58 Weybosset St., archt. Noted Feb. 5, C. D.

Mass., Roxbury — BREWERY, etc. — Star Brewing Co., 69 Shirley St., Roxbury, 2 story, basement, 65x105 ft., brick, steel, concrete brewery addition and alterations, to L. P. Soule & Son Co., 80 Boylston St., Boston, to exceed $40,000. Noted Jan. 23, C.D.—Jan. 30, E.N.-R.

Mass., Salem—FACTORY—Parker Bros., Inc., 190 Bridge St., general contract 2 story, 52x156 ft., brick plant addition, to Pitman & Brown Co., 40 Bridge St. Est. $37,000. Private plans.

Mich., Detroit—STORAGE—Star Steel Supply Co., 7522 Oakland St., 1 story, brick, concrete storage addition, to O. W. Burke Co., 1010 Fisher Bldg. Est. $40,000.

Mich., Yale—PLANT—Bodees American Fabrics, Inc., Yale, brick, steel, rein.-con. flax plant, plain found., to Webster Constr. Co., Chicago, Ill. Est. $150,000.

Mo., St. Louis — BREWERY — Carondelet Brewing Co., 217 South 18th St., constructing, reconditioning brewery, separate contracts now being awarded. To exceed $50,000.

N. J., Elizabeth — PLANT — Phelps Dodge Copper Products Co., South Front St., constructing plant addition, to Wigton Abbott Corp., 705 Park Ave., Plainfield. Est. $37,000.

N. Y., Brooklyn—FACTORY—Kienle & Co., 41 Nassau St., altering factory, to Giles Campbell Co., 51 Nassau Ave. Est. $40,000 with equipment. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., Buffalo—BREWERY—William Simon Brewery, improving brewery, separate contracts awarded***tanks, to Pfaudler Co., Gas & Electric Bldg., Rochester***equipment, to Liquid Carbonic Co., 3100 South Kedzie Ave., Chicago, Ill. Est. $90,000.

N. Y., Long Island City—STORAGE, etc.—Pepsi Cola Co., 47-31 33rd St., constructing storage and factory, 34th St. and 48th Ave., to Graves-Quinn Corp., Grand Central Terminal Bldg., New York. To exceed $37,000. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., New York—GARAGE—Gerosa Haulage & Warehouse Corp., 280 East 137th St., 1 story, garage, 781 East 138th St., day labor and separate contracts, $40,000. **Maturity after** April 1. DeRose & Cavalieri, 370 East 149th St., archts. Noted Jan. 13, C.D.—Jan. 16, E.N.-R.

N. Y., New York—BREWERY—John Eichler Brewery, 3582 3rd Ave., general contract 20,000 bbl. capacity stock storage, to Hubener-Escher Co., 748 Melrose Ave. Est. $150,000. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

N. Y., New York—SERVICE STATION, etc.—Rosedale Eng. Corp., 1460 Westchester Ave., service station, shop and garage, Leland Ave. and White Plains Rd., separate contracts will be awarded after Mar. 1. Est. about $37,000. Miller & Goldhammer, c/o owner, archts.

N. Y., Schenectady—WAREHOUSE, etc.—United Baking Co., 4 South Robinson St., general contract rebuilding warehouse and office, to Shear & Gordon, 852 Wright Ave., Schenectady; steel, to Schenectady Steel Constr. Co., South Schenectady. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

O., Beverly—PLANT—United Dairy Co., dairy plant, to C. Chalfant, Beverly. Est. $37,000 or more. Noted Oct. 24, C.D.—Oct. 31, E.N.-R.

O., Cleveland—FACTORY—Dobeckmun Co., W. D. Sweeney, in charge, 330 Monroe St., factory addition, 330 Monroe St., to Bison Co., 12406 Marston Ave. Est. $60,000. G. S. Rider, Marshall Bldg., archt.

O., Cleveland—STORAGE—Valuation Service Co., Guardian Bldg., 4 story storage and manufacturing plant, to Bolton-Pratt Constr. Co., Marion Bldg. Est. exceeds $200,000. Great Lakes Box Co., 7275 Wentworth Ave., Cleveland, and Sears Roebuck Co., South State and East Vanburn Sts., Chicago, Ill., lessees.

★ **Pa. Erie** — POWER PLANT — Hammermill Paper Co., Erie, power plant addition, to Stone & Webster Eng. Co., 90 Broad St., New York. Est. $500,000. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

Pa., Schenley—WAREHOUSE—Jos. S. Finch Co., Schenley, 8 story, basement, 100,000 bbl. warehouse, to Rust Eng. Co., Clark Bldg., Pittsburgh. C. J. Kiefer, Schmidt Bldg., Cincinnati, O., engr. Awarded Jan. 27

Wash., Seattle—WAREHOUSE—Seattle Brewing & Malting Co., 3030 Airport Way, 4 story, 66x100 ft. warehouse, 3030 Airport Way, to A. W. Quist Co., Exchange Bldg., $55,000. J. Wohleb, Chambers Bldg., Olympia, archt. Awarded Feb. 3.

Ontario — MINING DEVELOPMENT — May Gold Mines, c/o H. D. Tudor, 244 Bay St., Toronto, pres., gold mining development in various locations, day labor. Est. $100,000. Owner will purchase material and equipment. Noted Jan. 2, E. N.-R.

Ontario—MINING DEVELOPMENT—Wendigo Spiers Gold Mines Ltd., c/o Otto May, 10 Spring St., Toronto, constructing gold mining development in various locations, day labor. To exceed $100,000. Owner will purchase materials. Noted Jan. 2, E. N.-R.

★ **Que., Three Rivers**—GRAIN ELEVATOR—Owner, c/o Toronto Elevators Ltd., Queens Quay, constructing grain elevator (2 million bushels), to Carter-Halls-Aldinger Co., 51 Cherry St., Toronto, Ont. Est. $700,000. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

★ **Que., Quebec City**—PLANT—Grant Eng. Co. Ltd., 1164 Beaver Hall Sq., Montreal, constructing coke manufacturing plant, to Canadian Vickers Ltd., Montreal, $700,000.

★ **Que., Ville La Salle**—PLANT—Grant Eng. Co. Ltd., 1164 Beaver Hall Sq., Montreal, constructing coke manufacturing plant, to Canadian Vickers Ltd., Montreal, $750,000.

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